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P A P E R S

I N

A G R I C U L T U R E.



A G R I C U L T U R E.

IN consequence of the following Account and Certificates having been received, the GOLD MEDAL, being the Premium offered for sowing ACORNS, for the purpose of raising OAKS for TIMBER, was this Session adjudged to JAMES DENTON, Esq.

S I R,

BEING desirous to obtain the honorary Premium offered by the Society for the Encouragement of Arts, Manufactures, and Commerce, for the Improvement of Planting, I have enclosed a Certificate, which I beg to have the honour to lay before them for their approbation.

I am, S I R,

Your most obedient humble Servant,

JAMES DENTON.

*Brandon,
October 30, 1795.*

Mr. MORE.

THIS is to certify, that James Denton, of Brandon, in the Counties of Norfolk and Suffolk, Esq. planted ten acres three roods of land with Acorns, on his estate at Feltwell, in Norfolk, part broad-cast, and the other drilled, two bushels on each acre, in the months of October, November, and December, 1794; and that there are now more than three hundred young Oaks on each acre. In the same months planted the same ground with more than one thousand seven hundred larch and spruce firs and beech-trees on each acre; also planted twenty-seven acres one rood of land with Acorns, not less than one thousand five hundred Acorns on each acre, which were dibbled into a plantation of larch, spruce firs, and other trees, planted in the years 1791, 1792, and 1793.—There are now growing upwards of one thousand five hundred larch, spruce firs, and beech-trees, on each acre; and that, upon a view taken by us three days previous to the date hereof, the plants were in a thriving state and good condition, and well fenced in every part.

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Witness our hands, the thirtieth day of
October, 1795,

HENRY PRITCHARD, Rector of Felt-
well.

THOMAS AYLMER, Churchwarden
of Feltwell.

SAMUEL ELLINGTON, Gardener, who
set the above.

WILLIAM WEBB, Land-Surveyor,
who surveyed the above land.

GENTLEMEN,

I HEREBY acknowledge my signature to
a Certificate, purporting that James
Denton, Esq. in the parish of Feltwell, did
plant ten acres three rood of land, and also
twenty-seven acres and one rood, with
Acorns, in the months of October, Novem-
ber, and December, in the year 1794, and
which are now in a very flourishing state.

I am happy, Gentlemen, to bear witness
a second time to so expanded an act, which
has not only rendered a large tract of here-

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tofore-barren foil, an object of great future utility, but of singular beauty to the surrounding country.

I have the honour to be,

GENTLEMEN,

Your very humble servant,

HENRY PRITCHARD,
Rector of Feltwell, in the County of Norfolk.

The

The GOLD MEDAL, being the first Premium offered for raising OAKS, was this Session adjudged to the Rev. JOHN ROBERT LLOYD, of Aston, near Oswestry, Salop, from whom the following Account and Certificates were received.

SIR,

I TAKE the liberty of requesting you to acquaint the Society for Encouragement of Arts, Manufactures, and Commerce, that I last season made a plantation of Oaks in a field well fenced, and secured from trespass, which are now in a healthy state, and likely to grow fast.

The whole number was sixty thousand and twenty, of four-year-old plants, which had been raised in my nursery, fifty-eight thousand four hundred of which were planted between the 24th of November, 1793, and the nineteenth day of the following month; and in the spring 1794, before the 22d day of March, the remaining one thousand six hundred and twenty were planted: the
ground

ground had been fallowed and well manured for wheat, and after the harvest 1793, the holes were immediately made for the Oaks : when the plantation was nearly completed, nine thousand three hundred two-years-old Scotch firs were likewise put into the ground, under the supposition of their becoming a shelter to the Oaks, and to be cut away upon the first thinning; and I must also mention, that the field I selected is of a nature particularly suited to Oaks, and that it has been remarkably well drained and guttered, to prevent any water lodging upon it, to the injury of the young trees. The plantation will measure, within the fence, at least fourteen acres. Underneath you will see the Certificate of my gardener, which I hope will be satisfactory to the Committee, especially as I have had the honour of shewing you the plantation alluded to; but, if any other testimony should be required, I shall be happy to send it you. I cannot help entertaining a wish that I may be a successful Candidate for the Medal, as I have spared neither expence nor trouble

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trouble to execute the work in as perfect a manner as possible.

I am, SIR,

Your obedient humble Servant,

J. R. LLOYD.

Aston, October 26, 1795.

Mr. MORE.

I HEREBY certify, that the foregoing statement of trees planted by the Rev. J. R. Lloyd, of Aston, in the county of Salop, is accurate in every respect, as I attended the whole of the business, and made memorandums daily during its progress.

J. FAYEL, Gardener to the
Rev. J. R. LLOYD.

P. S. I have, as it may perhaps save trouble, requested the clergyman of the adjoining parish to certify, that a plantation as before described has been made.

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I WILLIAM DAVIES, Clerk, Vicar of Saint Martin's, in the county of Salop, do hereby certify, that a plantation of Oaks has been made by the Rev. John Robert Lloyd, of Aston, according to the manner described by him in the foregoing letter, and that I firmly believe every statement made by him therein to be perfectly accurate.

W. DAVIES.

*Saint Martin's,
October 26, 1795.*

The

THE SILVER MEDAL was this Session voted to THOMAS RICHARDSON, of Handale Abbey, in the North Riding of Yorkshire, Esq. as a token of the Society's approbation of his spirited conduct in forming the Plantation, although, from the Papers not having been received in due time, he could not be considered as entitled to the Premium offered for making such plantations.

S I R,

THE Society instituted for the Encouragement of Arts, Manufactures, and Commerce, having offered a Premium of a Gold Medal for planting the greatest number of mixed Timber-Trees, I beg leave to become a candidate for the truly honourable prize, having planted, from the month of October, 1789, to the end of February, 1791, upon forty acres of land, within my estate, one hundred and twenty-one thousand four hundred and thirteen Timber-Trees of various kinds, and enclosed the whole by a quick-hedge of hawthorn ;

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the particulars of which, with their healthy growing state at this time, will be more fully explained and proved in the Certificate enclosed in the paper superscribed Silva.

My LORDS and GENTLEMEN,

HAVING purchased the estate of Handale Abbey, in the North Riding of Yorkshire, on which there were about forty acres of land which had been formerly full of Timber-Trees, but which were for the most part cut down and destroyed, very little remaining but the underwood, and this overrun and browsed upon by the cattle, the fences being entirely thrown down, and the whole so much neglected, as to give no promise whatever of any wood rising from the old stocks, even if the whole was again enclosed; in this situation I immediately formed my resolution of planting the whole afresh; and, notwithstanding the expence which seemed likely to accrue from the great length I should have to enclose and secure with good fences, it being a
narrow

narrow slip of land in form of a crescent, on the declivities of the hills descending into a valley, one fourth part round the estate, yet I was not from this consideration driven from my purpose, being convinced that it would grow excellent Timber, and produce in time more profit than could be expected from cultivating the land. I therefore began to plant it in October, 1789, with mixed Timber-Trees, of the following kinds:—Oak, Ash, Elm, Beech, Sycamore, Alder, Larch-Fir, Spruce-Fir, Scotch-Fir, the white Dutch Poplar, and the black Carolina Poplar, disposing each plant in the soil best adapted to its growth; by the end of February, 1791, I had completed the whole, which contained one hundred and twenty-one thousand four hundred and thirteen trees, around which I planted a fence of hawthorn, secured by an outer fence, composed in part of posts and rails, and part of stake and band hedge. I have the satisfaction to say, that the trees are in a very healthy thriving condition, most of them indeed are remarkably luxuriant; and having kept the hedge clean, it is

now

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now become a very good fence, as is proved in the inclosed Certificate. I am, with the greatest respect,

My LORDS and GENTLEMEN,

Your obedient humble servant,

THOMAS RICHARDSON.

Manchester,
October 24, 1795.

Mr. MORE.

HAVING worked for some time in the plantations at Handale Abbey, I do hereby certify, that the trees planted therein are in a most flourishing condition: as a proof of this assertion, there are some white Dutch Poplars which were planted in February, 1791, and were then no more than two feet high, and not two inches in circumference, which I measured this day, and they are now twenty inches and a quarter in circumference at the bottom, and eighteen inches in circumference a foot from the ground, and twenty-six feet four inches high. These plants were sent from Manchester, a distance of one hundred and twenty miles, there

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there not being any of the kind before in this part of the country that I know of; and Thomas Richardson, Esq. was desirous of introducing them here, thinking they would succeed very well, and the result has proved his opinion to be right. This tree grows so very well in different situations in the wood, that we propagate numbers of them in the nursery every year, which are easily raised from cuttings stuck in the ground when well trenched.

THOMAS GOODLAD, Gardener.

Staithes,
October 24, 1795.

I DO hereby certify that Thomas Richardson, Esq. planted on his estate at Handale Abbey, in the North Riding of the county of York, from the winter of 1789 to the end of February 1791, one hundred and twenty-one thousand four hundred and thirteen trees of various kinds; and enclosed the whole with a living hedge of hawthorn, of the length of six hundred and eighty-one rods, of seven yards to the rod, which I

K

measured

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measured in conjunction with the Rev. Mr. Harrison, curate of Lofthouse. I have daily opportunities of viewing this plantation and enclosure, which has grown extremely well, many of the trees indeed surprisingly : the hedge is kept with the utmost neatness, and is already become an excellent fence, and, from the cleanness with which it is kept, forms a beautiful scene around the wood.

GEORGE SANDERSON.

*Handale Abbey,
October 23, 1795.*

The

The following Account having been received from LEWIS MAJENDIÆ, of Hedingham-Castle, Essex, Esq. TWENTY GUINEAS, being the Premium offered for the Culture of BEANS and WHEAT, was this Session adjudged to him.

SIR,

THE Society for the Encouragement of Arts, Manufactures, and Commerce, having thought fit to offer a Premium to the person who shall have planted or drilled, between the first of December, 1793, and the first of April, 1794, the greatest quantity of land (not less than ten acres), with Beans, and shall have sown the same land with Wheat, in the same year 1794; I am induced to submit the following account to the inspection of the Society, in which it will be found, that fifteen acres of land, part of my farm, have been cultivated precisely after the manner prescribed by their conditions.

Two fields, the one of eight, the other of seven acres, were planted with Beans in the month of February, 1794; the soil of the former field is a tender clay; of the latter, a rich mouldy earth, it having only been three years under the plough, and, previous to this, a pasture beyond memory. The Beans, which were of that small species called Horse Beans (*vicia faba equina*), were planted in the Norfolk mode, by children dropping them singly into holes, made on the soil with iron hand-dibbles, in rows about one foot asunder, and with a distance of four inches between the holes in the rows: this process is doubtless so well known to the Society, as to need no further explanation in this place. The quantity of seed planted on each acre was six pecks; and the total expence, in dibbling, dropping, ploughing, harrowing, seed, hand-hoeing, reaping and thrashing, was twenty-nine pounds, fourteen shillings, and threepence, or one pound, nineteen shillings, and sevenpence farthing, per acre.

The crops from these fields were reaped, and bound in small sheaves or bundles, which
were

were set up to dry in separate parcels, each of four sheaves; the reaping began on the 18th of August, 1794, and was continued, as the weather suited, till the end of that month.

On the 4th and 5th of September, the crop, from the field of seven acres, was carried in fifteen large waggon loads; and the field of eight acres was carried also in fifteen waggon-loads, by the 13th of the same month.

The produce of both fields was so carefully separated in the barns, as to prevent any mistake being made in the amount of either.

That from the field of eight acres was twenty-nine quarters, one coomb, and three bushels, or twenty-nine bushels, three pecks, and eight pints, per acre.

That from the field of seven acres was twenty nine quarters and two bushels, or thirty-three bushels, one peck, and eleven pints, per acre.

The whole quantity of Beans produced from these fifteen acres, was fifty-nine quarters and one bushel, which were sold for

one hundred and twenty pounds, eleven shillings, and sixpence.

The Bean straw was used as litter in the winter 1794, for several beasts which were fattening on cabbages in the yard, adjoining the barns in which the Beans were thrashed; by this means a great quantity of manure was made, which has since been carted out upon a large heap of earth and chalk, and now forms a rich and highly valuable compost for the future benefit of the farm.

Upon these fields, and with one earth or ploughing, Wheat was sown broad-cast between the 13th and 18th of October, 1794, and the resulting crops completely harvested on the 5th of September, 1795.

The same caution was used in separating the crops as on the former occasion; and the thrashing of both being now fully completed, I am enabled to inform the Society of the exact produce of Wheat from each field.

The field of eight acres has produced twenty-five quarters, one coomb, and three bushels, or per acre, twenty-five bushels, three pecks, and eight pints.

The field of seven acres has produced thirty-four quarters and two bushels, or thirty-nine bushels and nine pints per acre.

The great comparative fertility in this field, it should however be remembered, is to be ascribed to the small length of time it has been under the plough, and that this is the first crop of Wheat from it within the memory of man.

I have transmitted for the Society's inspection, a small sample of Beans, the produce from these fields in 1794, and two bushels of the Wheat from the present crops, for their acceptance, which last might seem indeed unnecessary, but that, from the whiteness of its flower, and thinness of its bran, I conceive it not unworthy of their attention, especially as it is not yet too late to be distributed and sown in the present season.

The stock from which this Wheat is produced was purchased by me two years since, from Mr. William Pollet, a very ingenious and active farmer, in the parish of Great Bardfield, in this county, who, a few years ago, paid singular attention to the various colours observable in the blossoms or an-

thera of Wheat, when in complete efflorescence : he noticed on his farm several ears whose blossoms were of different colours ; these he reserved apart when ripe, and then patiently cultivated the seed arising from them in separate spots in his garden ; the result has been a very high opinion of the present variety, of which he has since raised a considerable quantity.*

Such is the present good opinion entertained in my neighbourhood of this Wheat, that the greater part of the produce from these fields (except what was reserved to sow on my farm) has been eagerly purchased for seed.

I have the honour to be,

SIR,

Your very obedient humble servant,

LEWIS MAJENDIE.

Heddingham-Castle, Essex,
November 3, 1795.

Mr. MORE.

Expences

* This circumstance is noticed in page 25 of the General View of the Agriculture of the County of Essex, drawn up by Mr. Charles Vancouver, for the consideration of the Board of Agriculture and internal improvement.

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Expences attending the Bean Culture in Great Castle Field, containing Eight Acres, and in Cox Field, containing Seven Acres, (in the whole Fifteen Acres), in the year 1794, which Fields were sown with Wheat at the end of the same year.

			s.	d.	l.	s.	d.
1794	To Charles Green Brigh-						
February.	ton, for 7 days work						
	as dibbler in Cox						
	Field -	at	1	6	0	10	6
	To ditto, for seven days						
	and one half, in Great						
	Castle Field -	at	1	6	0	11	3
	To sundry children drop-						
	ping Beans - -		2	2		5	
	To ploughing 15 acres,						
	at 5s. per acre -		3	15		0	
	To bush-harrowing 15						
	acres -	at	0	3	0	3	9
	To 25 bushels Horse-beans, at		6	0	7	10	0
March 25 to }	To hand-hoeing 15 acres						
June 26 }	three times -	at	10	6	7	17	6
August 18	To reaping 15 acres	at	5	0	3	15	0
Nov. 3 to }	To thrashing 59 quarters						
Dec. 24 }	1 bushel of Beans	at	1	2	3	8	10
			<hr/>				
			£29 14 3				

Amount

Amount of the Produce and Sale of the Beans grown in Great Castle Field, containing eight Acres, in 1794.

1794	Qrs.	C.	B.	P.		£.	s.	d.
November 3	16	1	2	0	sold to Joseph Tomlinson, —	35	3	6
	0	0	1	2	refuse beans reserved for home use	0	6	0
22	0	0	3	2	ditto — —	0	14	0
25	0	1	0	0	fold to Ann Kent — —	1	0	0
28	12	0	0	0	fold Mr. Tabor, at Colchester —	24	12	0
	29	1	3	0		£.61	15	6

Amount of the Produce and Sale of the Beans grown in Cox Field, containing seven Acres, in 1794.

1794	Qrs.	C.	B.	P.		£.	s.	d.
December 5	13	0	0	0	fold to Mr. Tabor, at Colchester	26	13	0
11	2	0	0	0	ditto — —	4	2	0
1795	0	0	2	0	reserved for home use (refuse) —	0	8	0
January 11	14	0	0	0	fold Mr. Green, at Colchester —	27	13	0
	29	0	2	0		£.58	16	0

Rotation of Crops for Six Years.

GREAT CASTLE FIELD (EIGHT ACRES.)			COX FIELD (SEVEN ACRES.)		
1790	Barley		1790	Pasture, beyond memory	
1791	White Oats and Clover		1791	Black Oats	
1792	Clover		1792	White Oats	
1793	Wheat		1793	Barley	
1794	Beans		1794	Beans	
1795	Wheat		1795	Wheat	

I, CHARLES GREEN BRIGHTON, Game-keeper to Lewis Majendie, of Hedingham Castle, in the county of Essex, Esq. do hereby certify, that in the month of February, 1794, two fields, called Great Castle Field, containing eight acres, and Cox Field, containing seven acres, part of the farm of the said Lewis Majendie, Esq. were planted with Horse Beans in the Norfolk manner, by dibbling ; the whole of the dibbling being done by me, and the Beans dropped into the holes by children : that the quantity of seed sown to each acre was six pecks, that the Beans were duly harvested, and the produce from each field separated in the barn. And I further certify, that at the close of the year 1794 the above-mentioned fields were sown with Wheat.

CHARLES G. BRIGHTON,
Game-keeper to Lewis Majendie, Esq.
Hedingham Castle,
November 3, 1795.

I, BARKER MYALL, Churchwarden of the parish of Castle Hedingham, in the county

county of Essex, do hereby certify, that in the year 1794 I frequently saw two fields, named Great Castle Field, containing eight acres, and Cox Field, containing seven acres, part of the farm of Lewis Majendie, Esq. that they were sown with Beans in the early part of the year, and with Wheat at the close of the same year; that I have examined the minutes and accounts kept by Mr. Majendie during the growth of both crops, and do verily believe the facts stated by him, as also the contents of the annexed Certificate, signed Charles Green Brighton, to be strictly true.

BARKER MYALL,

Churchwarden of the parish of Castle Hedingham.

*Castle Hedingham, Essex,
November 3, 1795.*

Mr. MORE.

The

THE GOLD MEDAL, OF FIFTY GUINEAS, being the Premium offered for cultivating POTATOES on the greatest quantity of Land, not less than twenty acres, such Land not having been planted with Potatoes within the last ten years, was this Session adjudged to JOHN KINGSTON, of Oak Hill, near Barnet, Herts, Esq. who made choice of the Pecuniary Reward, and from whom the following Papers were received.

S I R,

WITH this you will receive a Certificate of the quantity of land cultivated by me last year with Potatoes : two thirds of the said land was a light gravelly soil, and the other a strong clay ; about four acres were planted in the manner recommended by the Board of Agriculture last year,* one
acre

* The mode alluded to, as recommended by the Board of Agriculture, was to draw furrows in the prepared ground, about three feet asunder ; in those furrows the dung (about fifteen large loads to the acre) was laid, then the sets were dropped on the dung, about nine inches asunder, and covered by the plough.

acre in the lazy-bed way, and the remainder in the usual manner, dropping the sets in the furrows after the plough, and earthing them up as the plough returned. The produce of the first was by much the finest, but not quite so abundant as the latter; that of the lazy-bed was not so much as either; but after the Potatoes were taken up with forks, the ground was in fine dry condition for dibbling in Wheat, which now looks exceedingly healthy and fine, and took only a peck and a half of seed to the acre.

I am persuaded that no Premium has ever been offered by the Society in the agricultural way, that will be attended with such general advantage to the country as that for encreasing and improving the growth of Potatoes; as it will (if the Premiums are continued) bring into cultivation thousands of acres that the owners would never have thought of cultivating without such encouragement: and to render it more generally beneficial, I beg leave to suggest, that were the Premiums to begin with a lower quantity of land, it would induce a great many little
farmers

farmers to cultivate from five to ten acres, who cannot spare dung and labour for more ; * and were the claimants obliged to lay not less than ten loads of dung on each acre, it would be the best preparation in the world for Wheat, which ought to be sown as soon as the Potatoes are got out.

I am, Sir,

Your most obedient humble servant,

JOHN KINGSTON.

January 19, 1796.

MR. MORE.

WE, John Pratt, Bailiff to John Kingston, Esq. of Oak Hill, in the parish of East Barnet, in the county of Hertford, and William Robinson, Ploughman to the same, do hereby certify, that we cultivated on the farm of the said John Kingston, at Oak Hill aforesaid, twenty-four acres of land, formerly wood and chase land,
in

* See the Conditions for the Premiums offered this Session for encreased Culture of Potatoes, page 33.

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in the year 1795; such land not having been planted with Potatoes within the last fourteen years, as the said William Robinson is ready to attest on oath, if required. Witness our hands, this 18th of January, 1796.

JOHN PRATT,

WILLIAM ROBINSON.

In consequence of the following Papers and Certificates relative to the culture of RHUBARB, the GOLD MEDAL, being the Premium offered for that article, was this Session adjudged to Mr. ROBERT DAVIS, of Minehead, Somersetshire.

An Account of the soil, culture, and aspect, of the Plantation of Rbeum Palmatum, or true Rhubarb, consisting of nine hundred and thirteen plants.

THE soil on which they now stand is light, but not what may be termed a light black soil. The ground is a spot in a field quite open to all parts, and without any declivity. The seeds were sown very thick about the month of July, 1786, in a small spot in a garden, where they remained till the following March, when the roots were all taken up, and transplanted at the distance of six inches; here they remained till the following spring, when I caused the ground where they now stand, being then a fallow, to be ploughed, and, at the distance

L of

of four feet, pits to be dug two feet deep, and to be filled again with one half rotten dung, and the other half the earth taken out of the said pits, and sifted ; thus raising the same four inches above the common level, to allow for sinking : I then planted one thousand and fifty three plants or roots. During the first summer and winter, a very considerable number of plants, from some unknown cause, died; and in the next spring, having a quantity of roots left in my plantation bed, I filled up all the vacancies completely ; since which time to the present, one hundred and forty plants have died, and nine hundred and thirteen are still alive and flourishing. I can give no account of the cause of any of their decay, but imagine it to have been occasioned from the rains in winter. I constantly kept the land clean from weeds, by hoeing, and have no other trouble with it.

ROBERT DAVIS.

Minehead,
September 29, 1795.

THIS

THIS is to certify, that we, William Hill, and Anthony Mogford, gardeners and labourers, of Minehead, did assist Robert Davis, of this place, in preparing the ground to plant out one thousand and fifty-three plants of the Rheum Pal-matum, or true Rhubarb ; and which were planted out accordingly, at the distance of four feet from each other. One hundred and forty of those plants, have, from unknown circumstances, since died: there are now stand-ing and growing, in a thriving condition, and have been so during the last summer, nine hundred and thirteen of the said plants. Witness our hands,

WILLIAM HILL,
ANTHONY MOGFORD.

*Minehead,
September 29, 1795.*

WE whose names are hereunto sub-scribed, being gentlemen, and resi-dents in the town of Minehead, in the county of Somerset, do hereby certify, that Robert Davis, of the same place, has, in a

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piece of ground in this parish, a plantation of *Rheum Palmatum*, or true Rhubarb, consisting of nine hundred and thirteen plants, at the distance of four feet from each other ; all which plants were in a thriving condition during the last summer.

PHILIP BALL,
FRANCIS BLAKE,
JOHN JENKINS,
PETER PRIEST.

Minehead,
September 29, 1795.

The

In consideration of the merit of the Rhubarb mentioned in the following Papers (samples of which are reserved in the Society's Repository), the Society have this Session voted their SILVER MEDAL to NICHOLAS ASHTON, of Woolton Hall, near Liverpool, Esq.

S I R,

THE beginning of this month I ordered my gardener to take up four roots of Rhubarb, which I received about sixteen years ago from Orford, in this county. After being cleared from the soil, I had the curiosity to weigh them; and, although from their age and want of a sufficiency of soil (it being only two feet deep before the roots touched the red rock), which caused the principal tap root to decay, yet the sound roots, so cleared, weighed seventy-three pounds. After causing the bark to be pared off the large roots, and scraped off the small ones, I directed the whole to be cut into pieces, and laid upon

the flue of one of the fucceffion houfes of my pinery, with a fmall fire to dry the Rhubarb gradually: it has dried it much to my wifhes; and this day, being perfectly cured, the roots weighed, in their prefent dry ftate, fourteen pounds and a half, and the bark three pounds and a half.—This amazing decreafe of weight has rather difappointed me; but I mention thefe particulars, as you wifhed to be informed how I fucceeded; and it gives me no little pleafure to find that Rhubarb of fo good quality, and with fo little trouble, can be raifed in this country.

I firmly believe that the four roots above mentioned would have produced an equal quantity of Rhubarb, had they been taken up ten years ago, if they had been planted in a deeper foil. They were continued in my garden for fo long a fpace, as ornamental and curious plants, being the *Rheum Palmatum*; they flowered very ftrong, and perfected their feeds, which, until laft year, the gardener had difregarded.

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I have now gathered a considerable quantity, and, if the Society think it an object, will order a field to be prepared, and planted out next spring; and you will be kind enough to advise me, whether to sow the seeds this month, or in February. If it is desired, I will send the Society the whole produce of my four roots by the mail coach, for inspection, the first Tuesday in November. With respect to the culture, the Rhubarb was planted in 1778 or in 1779, in good vegetable soil, in my garden, and remained undisturbed, but kept clear from weeds, until October, 1795, when it was taken up and cured, as mentioned in this letter.

I am, SIR,

Your very humble Servant,

NICHOLAS ASHTON.

*Woolton Hall, near Liverpool,
October 22, 1795.*

MR. MORE.

The GOLD MEDAL, being the Premium offered for gaining and securing Land from the Sea, was this Session adjudged to Mr. RICHARD MOYLE, of Marazion, Cornwall, from whom the following Account and Certificates had been received.

S I R,

I BEG the favour of you to lay the inclosed Papers before the Society for the Encouragement of Arts, Manufactures, and Commerce.—They contain a particular account of the drainage of a Marsh near this place, which for centuries has been overflowed by the tides, and hitherto looked on as irreclaimable; and which land is absolutely gained from the sea.

The novelty of the mode of drainage, with the success attending it, may probably attract the attention of those interested in Marsh Lands near the sea, in similar circumstances; and, from the prospect of success in its cultivation, a spirit of enterprise
may

may be excited in this country to make similar attempts.

Certificates of the ancient and present improved state of the Marsh, with a plan* of the inclosure, exhibiting the drains, fields, their measurement, &c. are annexed. From my experiments on marsh or peaty land, I have subjoined an account of the best method of cultivating the same, with the attendant expences; and also an account of the various uses to which peat, as an article of fuel, may be most advantageously applied; and which were never known to have existed in this Marsh before it was drained.

As my design of communicating the inclosed, arises from an ardent wish of promoting the laudable views of Agriculture, I hope the Society will excuse this irregular Treatise, which the want of time prevents me from arranging more methodically. Should the Society approve of my attempts to introduce the recovery and improvement

* The plan here mentioned is reserved for the inspection of the public.

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provement of such lands, which are greatly neglected in this county, I shall think myself highly honoured by any mark of approbation which they may think proper to confer on,

SIR,

Your most obedient humble Servant,

RICHARD MOYLE,

*Marazion,
October, 1795.*

Mr. MORE.

*An Account of the Drainage of a Marsh near
Marazion, in Cornwall, formerly over-
flown by the Sea, and looked on as irre-
claimable, but now in a state of cultiva-
tion.*

ON purchasing the leasehold of an estate near Marazion, in Cornwall, consisting of about two hundred acres, I found seventy in a state of good cultivation, and one hundred and thirty acres of waste land, consisting of marsh, croft, and sandy soils. I flattered myself, that a great part of this
unprofitable

unprofitable spot might be converted into useful and valuable land, which, in this neighbourhood, in the common state of cultivation, is worth from three to six pounds the Cornish acre (about one-fifth part larger than statute measure). From a prospect of recovering that part called the Marsh, which had hitherto been accounted irreclaimable, I laid down a plan of draining the same, which, if I succeeded in, might probably induce the proprietors of other tracts of Marsh-land in this vicinity, to make similar attempts.

The novelty of my draining scheme, with its attendant difficulties, joined to the great dislike which most farmers in the West of England have to the improvement of Low Lands, drew on me the censure of the public, who treated the scheme as chimerical, and impossible to be effected, for the following reasons :

First—Because the sea had access to this land, and overflowed it at spring-tides with two feet water ;

Secondly,

Secondly—If the sea were excluded, the fresh water would be accumulated, and still keep it in the state of a bog, as the water had no other vent than by its direct communication with the sea; and,

Thirdly—That if the success in the drainage should be equal to my most sanguine expectations, yet the nature of Marsh land, in general, would not admit of any valuable improvement.

However cogent these reasons might appear to the public, I was convinced that they arose more from the want of a spirit of enterprise, and little knowledge of the nature of such soils, than from a decided conviction of the failure of the plan; and, on considering the advantages likely to result from the improvement, in case of success, and the example given to my countrymen, who possess similar tracts of Marshland, I was emboldened to undertake the drainage of this bog, which for time immemorial had been looked on as utterly irreclaimable.

The

The spot fixed on for the intended improvement, consisted of sixty-three acres, statute measure; of which thirty-six acres were Marsh, seventeen acres of a light blackish sand, and ten acres of croft, consisting of a light black mould, with a substratum near the surface, of a fine tenacious clay. The croft and sandy land lay on a rising ground, serving as a surrounding skirting to the Marsh, and which, from their gentle elevations, might be useful in rainy seasons for cattle to resort to.

On considering that the most fertile soils consist of a combination of clay, sand, and vegetable matter, in different proportions, and that these three substances were almost distinct, and to be procured in any quantity from this improvable spot, it appeared probable that, after a complete drainage was performed, little more remained to be effected, than a happy combination of these three soils, so contiguous to each other, to render the whole good and productive land.

The

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The Marsh, containing thirty-six acres, is situated between the croft and the sandy foil, which has been thrown up by the sea, and serves as a natural embankment against the water, which at every spring-tide overflowed this Low-land to the height of two or three feet, by a direct communication of a river which carries off a part of the redundant water collected on its surface, from its own springs and others in its vicinity, and the rain from the higher grounds.

This Marsh, for time immemorial, has produced nothing but rushes, flags, gos (*arundo phragmitis*), *iris palustris*, water-lily, and several other aquatic plants, which, from their verdure, served only as a decoy for cattle, that were frequently smothered in attempting to reach them, to the great loss and injury of the tenants. Several persons also have lost their lives by getting at night into this morass, over which boats have frequently passed to enable sportsmen to secure the game, which flocked to this place in great quantities during winter. From the production of *Marsh miasmata*, fevers of the
low

low nervous kind, but particularly agues, have greatly prevailed, to the annoyance and distress of the neighbourhood.

The great and insuperable difficulty, which hitherto prevented even an attempt towards the draining this bog, arose from its being under the level of the sea at spring-tides; so that no deeper outlet could be procured than the river, which supplied it with salt-water. But, on considering the nature of water, which presses equally on every side, I suspected that a pipe, with a valve at its extremity, introduced at half-ebb, through the sandy embankment, to the body of the Marsh, would tend to carry off the surface-water; and, from the shutting of the valve, on the approach of the tide, no sea-water could gain admittance through the tube. On taking an accurate survey of the levels from the sea, at the point of half-ebb, to the surface of the ground in the Marsh, measuring in length one hundred and seventy-four yards, it was found that six feet of level could be gained, after allowing two feet for the flowing of the
water

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water through the pipe; accordingly, an embankment of one thousand one hundred and seventy-five yards in length, formed of strong clay turf, about five feet high and six feet thick, was made round the two sides of the Marsh, which were liable to be overflowed by the sea; the ditch serving as a channel to carry off the water, which used to flow over its surface. In order to carry off the water still remaining on the Marsh, I procured one hundred and seventy-four yards of square pipe, nine inches diameter and two inches thick, made of sound fir-wood called balk, which, in the mines of this county, is the wood most commonly made use of, and found to be very durable, especially if kept constantly in water.

In May, 1793, the first pipe was laid down on the shore, at the point of half ebb, and secured by means of a large rock, to prevent it from swimming; the other pipes were successively joined, and laid nearly on a plane with the first, by throwing open the sand. As we advanced to the highest part of the sandy embankment, which was twenty-four
feet

feet above the pipes, the difficulties were considerably increased, by the great quantity of sand necessary to be removed, and its tendency to fall on the workmen; so that the approach towards the Marsh became tedious, and very expensive. However, by pursuing every cautious plan which could be devised, to prevent accidents, and to make the work secure, we arrived, in five weeks time, at the borders of the Marsh, passing under the river and the new-made embankment at the depth of six feet under the surface, where the pipe opened into a reservoir of eighteen feet square and eight feet deep, prepared to collect the surface-water, which immediately flowed through the pipe with great rapidity, and discharged itself into the sea, till the whole of the stagnant water was taken off. The aperture of the sea-pipe had iron-bars placed before it, to prevent the insinuation of extraneous bodies, and also a valve made of strong wood, lined and hung with leather, and loaded with iron, to prevent it from swimming at the approach of the tide,

M which

which always shut it so close as to effectually exclude the sea-water: the pipe within the reservoir had also a similar valve, for the same purpose, near its extremity, which was covered with an iron grating, to prevent the intrusion of roots, weeds, &c. that might probably obstruct the passage of the water.

As soon as the tide returns to the pipe, which is uncovered six hours in twelve, the Marsh Water ceases to flow; and, during that time, collects within the reservoir and trenches till the sea begins again to retire; and when the collected water becomes of equal weight with the sea water over the shore pipe, it sinks gradually till the pipe is left by the sea, when it regularly discharges the water strained from the Marsh Land; and which amounts in winter to about 129,600 gallons, or 2160 hogsheads in twenty-four hours; but, in summer, the quantity is trifling, and does not exceed 43,200 gallons or 720 hogsheads. Some little difficulty at first arose from the valve not shutting itself properly, by the intrusion of pebbles; but this

was

was easily removed, by adding about two feet of pipe beyond the valve.

Trenches or open drains of three feet deep, five feet wide at the top, and three at the bottom, were immediately carried from the reservoir, which was the lowest place, to the extreme parts of the Marsh, on the sandy side, about six feet within the new embankment, and intersected by others at right angles towards the croft, from fifty to seventy-two yards distance, according to the nature of the ground, dividing the whole into regular oblong fields, as in the plan ; the wetness of the soil, and the great difficulty of procuring a firm footing for the workmen, obliged them to stand on pieces of timber, to complete those numerous drains, which every day grew firmer ; and in a few weeks the soil became so consolidated, as to admit of persons walking over it with tolerable safety. In making these drains a pot of copper coins, containing about one thousand, was discovered at the depth of three feet from the surface, which, on examination, appeared to belong to the Emperor Victorinus, who reigned in the third century ;

these coins were much injured by the corrosion of the marine acid, but several were still perfect enough to trace the outlines of the Emperor.

As soon as the evaporation assisted the consolidation of the surface, the air, within a mile of the Marsh, became so strongly impregnated with a sulphureous smell, as to render the place quite obnoxious to passengers, till the ground was perfectly dry : this might probably happen from the evaporation of the fluid parts, producing a decomposition in the mud, forming therein a *hepar sulphuris*; or hepatic air may be easily produced, by adding sea water to dung, or vegetable substances, from the vitriolic salts contained in the water, and which probably was the case in this soil. In the course of a few months the surface of the Marsh was depressed from twelve to eighteen inches ; so that the bed of the river became higher than the surface of the land.

In making the drains, it was discovered, that the upper stratum, of two feet and a half, consisted of a dark-coloured mud, formed
from

from the sediment of stagnant water and a peaty substance, bound firmly together by an infinite number of the golfs and rush roots; the substratum, an entire body of peat three feet and an half deep, of which twenty-one inches are of a very black colour, and the lowest part of a light brownish or deep yellow; under the peat lies a stratum of sand about five feet deep, which carries evident marks of its being the bed of the sea, of a very ancient date, and which has been gradually excluded by means of the accumulation of muddy sediments, and the dropping of the leaves, &c. of aquatic plants; and which together form peat mofs. The horizontal position of the leaves and stems, which are easily discovered in the peat, is a strong presumption of those bodies having fallen down, and being buried by the constant accumulation of mud, which with the leaves are the component parts of peat, though by some it has been said to be a vegetable production, *sui generis*. The total exclusion of air is absolutely necessary before these bodies will assume the real appearance

or properties of peat moss; and it is probable, that the upper stratum, which at this time partakes of very little of real peat, would at a future period, by the gradual addition of simular bodies and the exclusion of air, possess the same qualities and properties as the under stratum, and by this gradual accumulation totally exclude the sea. But the coins found in the Marsh indicate that the production of peat moss has been very slow in this particular spot.

The stratum of sand under the peat does not appear to be the original bed of the sea; for on streaming or searching for tin, from six to ten feet deeper, another stratum was discovered, consisting of round smooth pebbles and gravelly substances containing tin; among which are bodies of trees, and a large number of hazel-nuts in the most perfect state, and which must have been collected in this place by means of some extraordinary inundation, that swept those beds away from the higher lands.

In consequence of the discovery of peat in this Marsh, a large quantity has been cut
up,

up, dried, and made use of as an article of fuel, for a variety of purposes, to which it is admirably adapted, and sold at a much cheaper rate than coals, and boils water in much less time; it is applied in public breweries, and for every culinary purpose as an article of fuel; it is made use of to great advantage in grates, hearths, or ovens, and, when coaked, will serve for the nicest operation in chemistry, and in that state is sufficiently strong to smelt metals of the most difficult fusion: experiments are now making on it to calcine lime, which is intended as manure for this land. This peat produces a small quantity of red ashes, which, on lixiviation, are found to contain a large proportion of sea salt, which, for land not already impregnated with the marine acid, will prove a valuable manure.

After the drains were finished, all further operations on this land were discontinued till the spring of 1794, when the surface of a great many acres, consisting of light sedgey substances, was pared and burned during the summer, and the ashes spread over the land;

M 4 afterwards

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afterwards the plough was introduced, to destroy the amazing growth of the *arundo phragmitis*, which, from the infinite number of its strong spreading roots, bound the surface so firmly together, as to require a numerous team of cattle to plough it a proper depth, and which, from their frequent treading over the same ground, rendered the soft parts impassable ; but this difficulty was overcome by ploughing the first time without a mould board, so that fewer oxen were able to perform the same work. The soil, on being turned up, yielded a most offensive smell, though not of the sulphur kind. The land was frequently ploughed and harrowed, even to six or seven times, the inflammable substances set on fire, and the ashes spread on the surface. After all these operations, which were also repeated in 1795, the ground became considerably depressed and so consolidated as to admit of carts with narrow wheels, loaded with a ton of clay, to pass over it with great ease. On the sides of the drains, large quantities of yellow sea salt may be collected, and which were
produced

produced by the evaporation of its fluid parts.

In the spring of 1794, four acres of osiers were planted, after the ground had been thrown up into ridges ; but the large quantity of sea-salt destroyed the whole, except a few which grew on the higher ground in great luxuriance. The osiers at first put forth fine shoots ; but as soon as their tender roots absorbed the saline particles in the soil, they died immediately. Potatoes were also planted in large quantities the same season ; but most of them, particularly in the low places, where they never vegetated, shared the same fate.

On enquiry I find that those farmers who lay large quantities on their piles (heaps) of manure, experience the same loss on these spots for two or three years afterwards ; and then the ground assumes the richest state of vegetation. In the spring of 1795, after the surface was covered with large quantities of clay, several acres were sown with oats, some of which produced very good crops, particularly in those places where the marine

rine acid was diminished. Turneps and potatoes also grew well.

At present, the *poa trivialis* grows naturally in the greatest luxuriance on every part where the saline particles are not in too large a quantity: the appearance of this grass is a sure indication of the soil having parted with a large proportion of the salt. Several sorts of cultivated grasses have been tried in small quantities, as rye-grass, trefoil, clover, and meadow fox-tail (*alopecurus pratensis*), which thrive with great luxuriance; chicory (*cycorium intybus*) has been sown, and grows, but does not thrive well, most probably from the salt.

It is surprising to see the effects of frequent ploughing, &c., on this kind of soil, which, though at first only a congeries of roots and light substances, has, in a year or two, by such practice, assumed an earthlike appearance; and, with the addition of clay, lime, small quantities of manure, particularly of animal oil, and frequent heavy rolling, is likely to become, from the most useless spot, the most productive land for pasture, to

which only it should be applied.—In order to consolidate the soil more perfectly, so that the earthy particles may embrace the roots of the grasses, and retain their proper moisture, on which the luxuriance of such soils in a great measure depends, the surface is to be frequently compressed, by means of a rolling-cart, which may be burdened according to the state of the land, and is a most useful machine to carry manure on low-lands during wet seasons.

This machine consists of three circular pieces of strong elm, two feet diameter, and each eighteen inches long, through which a strong iron axis is passed, so as to protrude a few inches on each end beyond the rollers; after all, allowing an inch between each piece, for the convenience of turning round. On the projecting part of the axis, a fixed frame-work is placed to support the cart, which may be loaded to any degree, and employed simply as a roller, or to carry manure, &c. on land where common wheels cannot be admitted.

Every

Every Meadow in this improved spot can be watered with much ease, by means of the river close to the embankment, and which will be employed for that purpose, when pasture is introduced throughout the whole.

Marsh Lands in general will admit of the greatest improvement, by the following mode of treatment :

First—By a mechanical arrangement and change of its different parts, as by frequent ploughing, harrowing, and burning.

Secondly—By the addition of heavy substances, as marle, clay, gravel, &c.

Thirdly—By such substances as act chemically, and bring the inert vegetable matter into action, as lime, chalk, alkaline salts, &c.

Fourthly—By manures, particularly those which contain a large quantity of animal oil or mucilage, as putrid fish, sea-wrack, stable-dung, &c.; for Marsh Land in general seldom contains any animal substance, which, in
great

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great measure, is the grand constituent part of a rich soil.

Fifthly—By compression, with rolling-carts, cattle, &c.

Sixthly—By watering.

The Sandy and Croft Soils adjoining to the Marsh have been cultivated, and produced this summer very excellent crops of Potatoes, Turneps, Barley, Oats, Buckwheat, and Tares.

RICHARD MOYLE.

October 16, 1795.

An Account of the Expences of draining and recovering thirty-six Acres of Marsh Land from the Sea, belonging to Richard Moyle, of Marazion in Cornwall, performed in 1793.

	£.	s.	d.
To timber for the pipes, 174 yards in length,			
9 inches diameter within —	18	10	0
Carriage of ditto —	0	15	0
Carpenters, for sawing balk, and making			
pipes with valves, nails, &c. —	10	9	2
Smith for iron bolts to secure the pipes			
to the rocks, gratings, &c. —	2	10	0
	<hr/>	<hr/>	<hr/>
Carried forward	32	4	2
			To

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	£.	s.	d.
Brought forward	32	4	2
To labourers for throwing open the sand from 1 to 24 feet deep, and fixing 174 yards of pipe, from the 11th of May to the 15th of June, 1793 —	44	2	4
2,412 yards of open drains, 3 feet deep, 5 feet wide at the surface, and $2\frac{1}{2}$ feet at the bottom, at $2\frac{1}{2}$ d. per yard —	25	2	6
Repairing and clearing the same —	6	18	3
765 yards of croft trench, at 5d. per yard	15	19	7
1175 yards of embankment, to keep off the sea, 5 feet high and 6 feet thick, at 6d. per yard — —	29	7	6
Repairing the same at different times	8	13	1
Flood-gates to keep back the sea at spring-tides, iron-work, &c. —	2	2	0
Total expence of draining 36 acres of Marsh Land, and keeping it dry	164	9	5
Or, per acre — —	4	11	$4\frac{1}{2}$

An Account of the average Expence of cultivating and improving a Statute Acre of Marsh or Peat Land.

	£.	s.	d.
To paring the surface — —	1	17	4
Drying, gathering, and burning the turfs	0	10	0
Spreading ashes — —	0	2	0
Six ploughings, at 10s. — —	3	0	0
Carried forward	5	9	4
	To		

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	£.	s.	d.
Brought forward	5	9	4
Five harrowings with rolling, at 5s.	1	5	0
Horfe-raking and burning roots, &c.			
three times, at 2s. 6d. — —	0	7	6
Spreading afhes three times, at 1s. —	0	3	0
200 tons of clay, paid for raifing, at 1½d.	1	5	0
Filling and carting the fame, at 3½d.	2	18	4
Spreading ditto — —	0	3	0
40 bufhels of lime (mixed with 240 bufhels of peat), at 9d. —	1	10	0
Carting and fpreading the fame —	0	3	0
40 cart-loads of dung, at 1s. 6d. —	3	0	0
Carting and fpreading the fame —	0	12	0
Earthing up ridges with a double-mould board plough, to keep it dry during winter — — —	0	2	6
Grafs feeds of different forts, with har- rowing and rolling — —	0	12	0
Expence of cultivating per acre	17	10	8
Expence of draining per acre	4	11	4½
Total expence of improvement per acre	22	2	0½

Thirty-fix acres, at £22: 6s. 2½d. per acre, is £795: 13s. 6d.
 —the amount of all the Expences to make the Marfh
 Pafture Land.

WE certify, that the fpot of land near
 Marazion, in the county of Corn-
 wall, called the Marfh or Bog, which was
 drained, in 1793, by Mr. Richard Moyle,
 of

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of the said place, has been covered, from time immemorial, with several feet of water, collected from springs and streams from the higher lands, and from the regular overflowing of the sea at spring tides. The inhabitants of the villages around this stagnant water were formerly visited with agues every year, which now are seldom heard of. We have passed over this Marsh in a boat, during winter, in quest of game, as footing in most parts of it was unsafe. This land was formerly of no value, but rather an injury to the tenant, from the frequent loss of his cattle, which at times have been smothered in it, and its spontaneous produce only rushes and gos. No attempt was ever before made to remove the surface water, from the apparent impossibility of draining land under the level of the sea; but it is with much satisfaction that we can certify, of this Marsh being now most completely drained, by means of a square wooden pipe, nine inches diameter, and one hundred and seventy-four yards long, passing from a reservoir in the Marsh six feet under

its surface, through a high embankment of sand, in some places twenty-four feet deep, to that part of the shore where the tide approaches at half-ebb, and which, at spring-tides, is covered with above ten feet of water.

The sea is prevented from getting into the said pipe by means of a valve at its end, which shuts at the approach of the tide, and again opens at its return, so as to permit the water, collected in the reservoir during that time, to pass off with ease. The whole Marsh is surrounded with a strong embankment, to keep out the sea and the fresh-water. The land is divided into regular fields, by means of drains or trenches, as expressed in the plan sent, sufficient for the use and occupation of a tenant. Several acres of the land have been frequently ploughed, harrowed, and burned; and, being now completely pulverised, assumes the appearance of soil. Large quantities of clay have been carried and laid on its surface, by means of carts, which pass over

it with as much ease as on the firmest lay ground. Crops of Oats, Potatoes, and Turneps, have succeeded very well this season, except on some of its lowest parts, where the saline particles deposited by the sea, are still in too large a quantity for vegetation to take place. Grass seems to thrive with great luxuriance; and the whole promises to become, in a few years, from the great labour and expence of manure, clay, lime, &c. bestowed on it by Mr. Moyle, a valuable spot of pasture-land. The croft and sandy soil adjoining to the Marsh, which were never before cultivated, have produced good crops of Barley, Oats, Potatoes, Turneps, Buckwheat, and Tares.

This singular mode of drainage seems to be quite new, as far as we know, or ever heard of, and which was never suggested for this purpose, till put in execution by Mr. Moyle; and which is the only plan that could possibly drain this spot of land so much under the level of spring-tides, and which may be applied with great advantage
to

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to Low-lands, situated in similar circumstances, so as to recover them from the sea.

RICHARD JOHN, Ludgvan, near
Marazion.

JOHN JAMES, Marazion.

October 16, 1795.

WE, the undersigned, do hereby certify, that the eastern part of a tract of land, called the Marsh, lying between the towns of Penzance and Marazion, and situated near the sea, so as usually to be overflowed at spring-tides, was completely drained during the summer of 1793, by Mr. Richard Moyle, of Marazion.

The drainage was effected by the introduction of a strong wooden tube, at the level of half-ebb, through a bank of sand and gravel, which defends the Marsh from the immediate action of the sea, for a great part of its length. Reservoirs are constructed for containing the water, when the sea rises above the tube; and a valve, at the further extremity, effectually prevents the entrance

of any salt-water. The tube enters the Marsh at about six feet under its surface, from whence drains are conducted to the different parts, forming, with the embankment against the river and sea, a work of considerable labour and expence. In its former state, the land was of very little value, producing scarcely any grasses, but abounding in rushes, reeds, &c. It is now perfectly drained; a large part of the surface has been pared and burnt; several acres have been completely pulverised, by repeated ploughings, rollings, and harrowings; and large quantities of clay have been added to the soil. The chief obstacle to its immediately becoming good land, seems to consist in the too large portion of sea-salt remaining in the ground, since the more elevated spots have already afforded favourable specimens of Corn and Potatoes, whilst the drains, conveying fresh water, abound with vigorous grasses, principally Poas. It is proposed to get rid of part of the salt by flooding, and to counteract the remainder by animal and vegetable recrements and lime;
 this

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this last will be calcined by peat, found in great abundance in some parts of the newly-drained land, and which promises, as an article of fuel, very materially to benefit the neighbourhood.

DAVIES GIDDY, F. R. S.
of St. Erth, Marazion.

HENRY WILLYAMS, Clerk,
St. Erth, Marazion.

October 14, 1795.

THIS is to certify, that I measured a piece of land in the parish of Ludgvan, near this place, called the Marth, which was formerly covered with water, but now completely drained by Mr. Richard Moyle, and become so firm as to admit of heavy-loaded carts passing over it with great ease. The whole is divided, as in the plan, into regular fields, by means of open drains, fit for the use and occupation of a tenant, and surrounded, on the sea-side, with a strong embankment of turf, about five feet high and six feet wide; and, on the land-side, with a large open drain to

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carry off the water from the higher lands, so as to render the estate completely secure from inundation.

The measurement of the adjoining high lands, consisting of croft and sandy foil, which were never before cultivated, is also annexed.

		Acres. Rods. Poles.		
The Marsh contains	—	35	3	35
The Croft	—	10	1	20
The Sandy Soil	—	17	0	0
		<hr/>		
		63	1	15

		Yards.
The Embankment	—	1175
The Drains	—	2412
The Croft-drain	—	765
The Draining-pipe	—	174

JOHN COCK,
School-master, Marazion.

October 12, 1795,

Several

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Several Claims for the Premium offered for DRAINING LAND, being the GOLD MEDAL OF THIRTY GUINEAS, were this Session received by the Society; and the Premium adjudged to Mr. JOHN CROCKITT, of Woodford-Grange, near Wolverhampton, who made choice of the Pecuniary Reward. His original Papers, with a Sketch of the Drains, are reserved in the Society's Collection.

S I R,

I SHALL be obliged to you to lay before the Society for the Encouragement of Arts, Manufactures, and Commerce, the following particulars on a subject, which I believe comes under their plan of general improvement.

Being in possession of a valley containing thirty-six acres, consisting of wet peat intermixed with quicksands, the understratum gravel, varying in its depth from three to eight

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feet,

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feet, I determined to try some experiments towards improving it. I proceeded to obtain a fall by a main drain, three quarters of a mile below the land I intended to improve. In carrying up the valley the master drains, I found it necessary frequently to leave the work for a week or longer, to carry off the top-water; and then take off ten or twelve inches at a time only. Two years attention enabled me to complete them, by deepening at several times to the average of six feet, with a proportionable fall. I then proceeded to strip the remainder of the surface of its incumbrances, consisting of some very ordinary alders, and an immense quantity of what is here called hassocks, being tufts of close-matted roots of the sedge kind, rising to the height of four or five feet above the surface, with blades of rough grass hanging to the ground each way. The whole valley is bounded by a water-course (which I have deepened) on the one side, and a cut to obtain a head for the use of an iron-work on the other. Here I

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must observe, we had two leakages to encounter, this cut being raised from four to six yards perpendicular above the land improved; the natural consequence of a valley parallel, with a bank of light gravel and sand. Our greatest breadth is not more than one hundred and forty yards, and in general nearly level.

I proceeded to cut my carriers and catch-drains four feet deep, forming oblong squares, eight by fourteen or sixteen yards, frequently nearer; sometimes bottoming the peat, at others not; and often found it necessary to leave them open for two or three months, and join the communication at every angle. The materials used are some alder rods, to prevent the bottom of the drains from sinking, which often happens where it is not expected, and is my reason for giving it every draught in my power: two parallel rows of stones, a second row upon them, then a third; making a body of from fifteen to eighteen inches deep at least, exclusive of the covering,
which

which is formed substantially by the haf-focks quartered. After stripping them of their sedges, so as to fit close, I level the surface, dress it with lime and other compost, and seed it.

As we have water sufficient to flood the whole, I had in view the advantage the farm would receive from the great quantity of manure annually procured for it, by the improvement, that is, the produce of the valley consumed upon it, and no return required. I have done this year two thousand one hundred and twenty-five yards upon four acres and an half, exclusive of the master-drains: the quantity of water emitted is twenty hogheads per minute. Estimating this by that done two years ago, I conceive its future value twenty-five or thirty shillings an acre per annum: its former, as valued by Mr. Bishton, of Kilfal, four years ago, was two shillings and sixpence.

Such, Sir, were, for ages, the situation of Woodford Moors, without being of service,
often

AGRICULTURE. 187

often detrimental, if cattle, allured by the verdure of the cress-beds, ventured to go upon them, as we had them to draw out again, injured or smothered. If my labour is not beneath the notice of the Society, I humbly beg leave to offer myself a candidate for the premium offered for such improvement. If I have not literally complied with the terms directed, it was because I conceived the laying so large a number of drains far more likely, by assisting each other, to be lasting, than any other method I have yet heard of, where fewer communications were made; and I believe I have made twenty-five acres of land more than ten times its original value.

I remain, SIR,

Your obedient humble servant,

JOHN CROCKITT.

*Woodford Grange,
near Wolverhampton,
December 30, 1795.*

Mr. MORE.

Average

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Average Expence per Acre, exclusive of the Master-Drains.

	£.	s.	d.
450 yards of Covered-Drains, at $1\frac{1}{2}$ d.	2	16	3
35 loads of Stone, Carriage, &c.	3	10	0
Grubbing-up the Hafts, prepa- paring, &c.	-	0	12 0
Levelling the Surface	-	0	15 0
Nine quarters of Lime, Carriage, and Spreading	-	2	2 0
	£.9	15	3

WE are acquainted with the land above-mentioned: before the improvement, it was a morass, wet, springy, and impassable; and it is now dry. We believe the fore-mentioned statement to be true; and that the land is rendered above ten times its former value.

J. BEVAN, Minister of Tryfull.

THOMAS BARNESLEY,
Churchwarden,
Jos. HIGGS, Overseer
of the Poor,

} of Tryfull.

SIR,

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SIR,

IN consequence of a request from Mr. John Crockitt, who occupies a farm belonging to me, situated at Woodford Grange, in this county, I have examined the part of it called Woodford Bogs, and find that which has been last year improved, sufficiently drained to bear any sort of cattle. I had previously examined the statement sent to the Society, and have every reason to believe it to be perfectly correct, and the Certificates to be signed by proper and respectable persons residing in the neighbourhood. The expence incurred to procure a fall, and the difficulty arising in the execution, will, I hope, render Mr. Crockitt worthy of the attention of the Society; and the more so, as he intends pursuing his improvements, on a situation hitherto unfit for all agricultural purposes. I am, SIR,

Your obliged humble servant,

JOHN WROTTESLEY.

*Wrottesley,
near Wolverhampton,
March 2, 1796.*

Mr. MORE.

The

The Thanks of the Society were this Session given to Mr. JOHN MIDDLETON, of Paradise-Row, Lambeth, for the following Paper on MAKING HAY, with Drawings annexed thereto, as shewn in the Plate annexed.

HAVING observed in the course of my reading, that somewhere in the North of England, it is not altogether uncommon to see some of the inhabitants dragging their hay together, without the assistance of either cart, waggon, or sledge ; and having myself experienced that much time, and, in general, the best workmen, are employed in loading the carts in a hay field, particularly at a time when the price of labour is high, and hands not always to be procured ; I was induced, from these considerations, to turn my thoughts to the subject; and, in consequence, sketched the lines for a carpenter to make me the following machine, for the above purpose ; and it performed the work so well, that I used it all last hay-time with great advantage.

It

It is drawn by four horses, in pairs, with a boy to manage and drive each pair. On smooth ground these alone were sufficient ; but, where the machine was to be drawn across ridges and furrows, it was found necessary to have a man to attend with a fork in his hand, which he should use, as often as the machine shews a tendency to slide over the still row of Hay, by thrusting the prongs into it to the greatest depth that can be done, without suffering the points to touch the ground, and nearly close to the Hay then in motion by the machine : the moving-hay advances to the fork, and drives forward the hay so held by its prongs, and with it all that part of the row ; and, it being once put in motion, the machine keeps it so. The man should keep walking briskly forwards before the machine, and put the fork into the still-hay, until the machine gets hold of it, as often as may be necessary, which will be particularly so in passing every furrow ; but in level fields this will seldom happen ; though I found that, even where the ridges were a little unfavourable, as in
the

the case of being too round, the machine was prevented from being stopped or impeded by breaking the row of Hay at every twenty or forty yards distance.

I shall endeavour to make the whole more clearly understood, by the following sketches and explanations, to which I beg leave to refer you; and shall now proceed to observe on what I conceive to be its particular merits.

In cases where the Hay can, without inconvenience, be stacked in the field, it will entirely supersede the use of every sort of carriage, as it may be made to draw all the Hay in the field to the stack; and it may, with equal facility, be made to draw the Hay produced on any number of fields to one place, provided the gateways are made sufficiently wide to admit the machines passing through; namely, about fifteen feet: and consequently all the Hay of any farm might thus be drawn to the stack-yard. But it appears to be advisable, as a matter of prudence, to confine its use to a grass surface, as in passing over gravel roads, gateways,
 &c.

&c. it would probably pick up some dirt, and other extraneous matter, which might be injurious to the Hay.

It will be found useful in very scorching hot weather, especially when hands are scarce, in dragging the Hay together the moment it is sufficiently made, and thereby preventing (what frequently happens) its being too much dried. In catching or showery weather it will be of still more service, as in the case of a field of Hay, more or less, not being quite fit to carry to the stack, and symptoms of approaching rain appearing, the whole may generally be swept into heaps, containing as much as the horses can drag at twice, by fetching the ends of each row to the middle, or, by drawing two or more rows into one heap, and employing every hand in making it into large cocks (or pikes), containing a ton or two in each (proportioning the size to the dryness of the Hay): thus the whole may frequently be secured before the rain falls; and, if properly made, they will turn all the rain that may fall. Even if the weather should prove wet

for a week or more, these cocks will be found to have sustained no very material damage, except that the outsides will be a little stained or discoloured by the rain, and the bottoms by damp arising from the ground ; the latter will always happen when the cocks are suffered to stand a fortnight or more in the field, but the former will only happen in case of uncommonly heavy or long-continued rains.

In cases where the Hay is sufficiently made to bear stacking, and there is an appearance of rain, it may be speedily dragged to one place near the middle of the field, and all hands employed in making the stack, which may immediately be secured by putting a cloth over the top ; and even where a cloth is not at hand, only let it be made sufficiently high in the middle, hard trod, and well raked down on the outside, and it will be almost equally secure.

I experienced its use in all these cases last summer, and am of opinion, that when the boys are agile, and the horses tractable, and
used

used to the work, ten acres of Hay may be thus secured in little more than an hour.

I am, SIR,

Your very humble servant,

JOHN MIDDLETON.

*Paradise-Row, Lambeth,
November 26, 1795.*

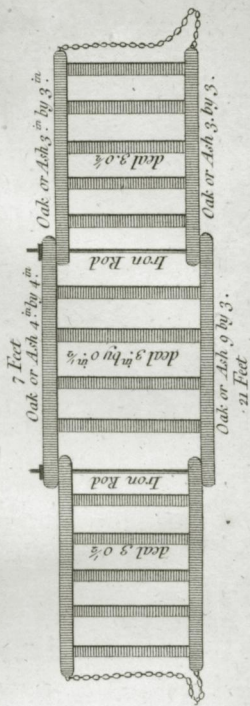
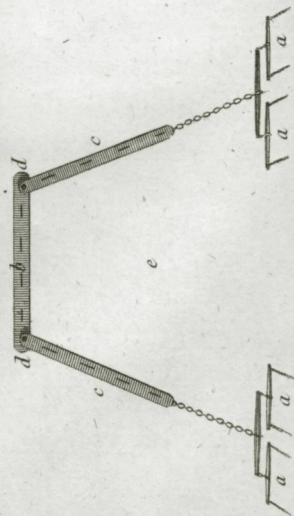
MR. MORE.

*Explanation of the Machine and the manner
of using it, as shewn in the Plate.*

IT will first be necessary that the Hay should be put into rows, as is universally done before the loading of carts, waggons, or sledges; then, in order to sweep the Hay together with greater facility, order a man with a fork to go and turn the end of a row up, two or three yards, so as to form a sort of heap, and then walk on ten, twenty, or forty paces, and break the row, by turning the Hay forward into another similar heap; and let him go on and repeat this operation to the

end of the row, which he should do as fast as he can walk ; then order the boy who has the management of that pair of horses, to whom the empty machine is attached, to draw it across the end of the row ; and, the moment the centre of the machine is at the middle of the row, let him turn his horses short round, to within a yard or two of the Hay, so as to be in a proper position to set off : the other boy must instantly place his horses on the opposite side of the row, and hook the chain of his splinter-bar to the machine, pulling the gate or side of the machine round, so as it were to clasp the Hay as at (*a*). The boys being mounted, and all now ready to start, let them draw slowly on for the first twenty or forty yards ; they may then, if the business requires dispatch, increase their pace, urging the horses into their fastest walk, and from that into a slow trot, until as much Hay is collected as the horses can draw : then, unhooking one end, let the horses at the other, turn from the Hay, and draw out the machine from behind it : then trot away to the end of the next row, and repeat the process, taking
care

View of Mr. Middleton's Machine at Work.



care to keep the horses on each side of the Hay, at equal distances from the row, and opposite to each other. When the Machine is loaded, and the intention is to draw the load to a distant place, the four horses cannot be kept too near together.

The Elevation of the Machine, as it appears when drawn by one end, and empty, is shewn in the lower part of the Plate, where the scantlings of the several parts of the Machine are marked.

The Plan of the Machine, when in the action of drawing the hay, is also shewn in the lower part of the Plate, and lettered as follows.

- a. a. a. a.* The places occupied by the horses, when drawing (though in many cases one horse on each side would be sufficient).
- b.* The back, or principal part of the Machine.
- c. c.* The sides, or gates of the Machine, which swing on the iron rods fixed in the back at *d. d.*
- e.* The row of Hay.

A Bounty of FIFTEEN GUINEAS was this Session adjudged to Mr. EDWARD KNIGHT, of Great Bardfield, Essex, for his NEW-CONSTRUCTED HARROW ; a Plate of which is annexed, and a Model reserved in the Society's Repository.

FINDING, in the course of my business in husbandry, many inconveniences attending the common mode of harrowing, and that it fatigued my horses much more than the work of ploughing, any plan that should occur to me for their relief, as well as for obviating every other difficulty, I flattered myself would be an object essentially serviceable. It must be a remark discernable to every person, who will pay the least attention, that the common Harrow is almost a dead weight after the horses ; the irregular and uneven motions cause incessant checks, which the horses must inevitably feel the unpleasant effects of, both from their collars as well as the traces. I likewise frequently experienced some trouble by the Harrows

Harrows being clogged up, in consequence of too great a weight on the fore-teeth.

In order to remedy these, as well as many other inconveniences, I was induced to try a pair of wheels with the axle-tree entire, which I found answered the purpose with respect to the horses, as the Harrows worked much easier; they prevented the too great stress on the fore part, which of course was not so liable to be choaked up, by collecting every impediment that might fall in the way; and the workman found little or no difficulty in keeping his Harrow clean, a circumstance difficult to be done with the common Harrow. Though I was perfectly satisfied that this plan had a material effect, by being much easier to the horses, as I have before observed, still I met with great inconvenience from the axle-tree being entire; it required a considerable scope of ground at every turning. I likewise observed, that if either of the horses was more forward than the other, or not perfectly steady in his drawing, the wheel left the furrow proportionably, and lost its strait

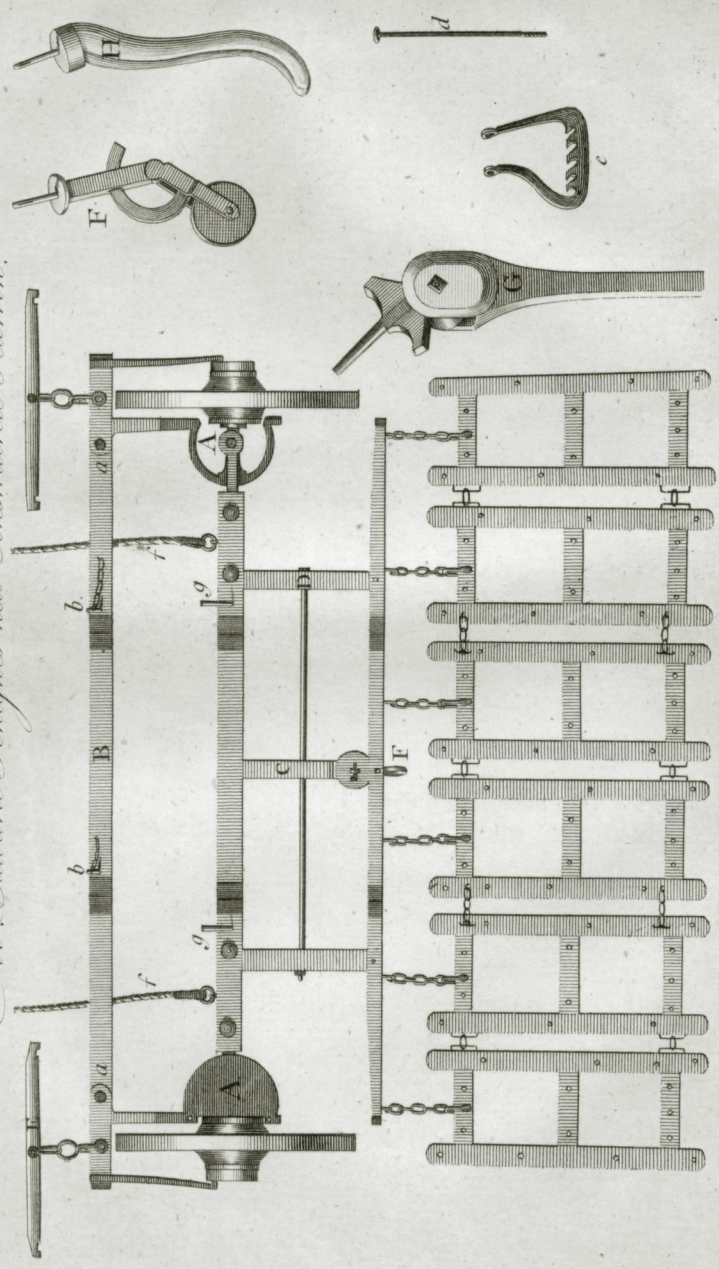
O 4 direction :

direction : another objection I made to the axle-tree being entire, was that it greatly incommoded me in passing through the gateways, when I wished to convey my Harrows from one field to another.

In order to remove these difficulties, I have contrived two joints, A A, in the axle-tree, one of which, in the print, is covered, as when the Harrows are at work ; the other uncovered, to shew the construction of the joint ; and two joints, *a a*, in the front of the bar ; by means of which I find, by repeated trials, that the pliability of the tree, and likewise of the bar, humours the wheels and keeps them in their proper directions in the furrow, and, requiring very little scope of ground, the turnings are rendered very convenient and easy. The objection I started with respect to the removing the Harrows, as occasion required, I find now perfectly done away.

If, in the course of working the land, a farmer varies in the breadth of his furrows, I have contrived, in order to make the Harrow narrower, that part of the bar, B, which

Mr. Edward Knight's new Constructed Harrow;



which is fastened by two pins, *b b*, to be taken off, when requisite; part of the axle-tree, and part of the hind bar, *C*, which are fastened likewise by the iron-bolt, *D*, to be also removed; and the remaining outward parts to be joined and fastened by one of the two pins in the bar, and by a shorter bolt, *d*, intended for the axle-tree and hind bar.

If the farmer should work two horses, which are unequal in height, the horizontal direction or evenness of the joints may be destroyed in some degree; and, to remedy and supply this deficiency in the horses, I have made a whipple-tree, *E*, to be heightened or lowered, by means of notches, *e e*, to which it is connected by a ring. In light barley-lands, when you accommodate your Harrow for one horse, by narrowing it as before directed, there are two strings conveyed by two rings from the axle-tree, through two loops, *f f*, under the front bar. The wheel, *F*, under the hind bar, which is also shewn enlarged in the Print, at *F*, will support the bar, and, by this assistance,

the Harrow is conveyed to the field on the axle-tree bar, as a substitute for a sledge: there are also two wooden pegs, *g g*, by which the Harrows, when turned upon the carriage, are secured.

Should it be objected by some, that the Harrow will prove expensive, on account of the iron, an axle-tree and joints may be readily constructed in wood, upon the same principles, as shewn in the Plate at *G*; though, for my own part, I give much the preference to iron. If the wheel under the hind bar should not be adopted, there is a slider, *H*, which works with a pin, and, when not wanted, is turned and fastened under the axle-tree.

EDWARD KNIGHT.

*Great Barfield,
near Braintree, Essex.*

*To the Society for the Encourage-
ment of Arts, Manufactures,
and Commerce.*

WE, the undersigned, occupiers of lands and others, in the neighbourhood of Edward Knight, have seen the Harrow

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Harrow at work, as represented in the Plate, and find it answer every expectation. We find it very convenient in the turnings. We are perfectly satisfied that it is much easier to the horses; and the additional improvement of the joints gives a steadiness in the furrow, whenever the horses prove untractable: the wheels are likewise the means of the horses taking an equal share in the draught. We beg further to express our good opinion of John Knight, Edward Knight's workman, as a person well skilled in the practical part of husbandry; and have taken the liberty of inclosing his certificate.

Great Bardfield, Essex.

WM. PHILLIPS, Vicar.

W. POLLETT, sen.

WM. POLLETT, jun.

THO. SMITH,

G. SMITH, jun.

JOS. SMITH,

G. HICKS,

THO. KNIGHT.

I JOHN KNIGHT, having constantly used the Harrow, as represented by Edward Knight's model, do find it answer the intended purpose, and that without exception, in my opinion; and I am thoroughly convinced, that, by this improvement, two horses will in most respects answer the purpose of three.

JOHN KNIGHT.

Great Bardfield, Nov. 9, 1795.

FRIEND MORE,

A GREEABLY to thy request, at foot is the price (or thereabouts) of a set of Harrows and carriage, according to the model sent to the Society for the Encouragement of Arts, &c. and may inform the Society, the Harrows have been used on my farm more than twelve months. I find them particularly useful this wet feed-time, as two horses do the work of three, and always go in the furrow, otherwise must go on the middle of what we call the stretch; others call them broad lands. I
also

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also find them (that is the wheels with a short axle-tree) very useful with my crab-harrow, more than a horse's draught difference ; and remain

Thy friend,

EDWARD KNIGHT.

	<i>£. s. d.</i>
The carriage for the Harrows —	1 1 0
Two Whipple-trees —	0 1 0
56lb. of hammered Iron, at 6d. or } 60lb. cast ditto, at 2d. (10s.) }	1 8 0
A pair of Wheels with Iron-work, } or a pair of second-hand ditto, 12s. }	2 3 0
	4 13 0

	<i>£. s. d.</i>
Or, with second-hand Wheels and Cast-iron	2 4 0
Three pair of Harrows complete —	2 0 0
If the Frame is made to take shorter, as represented in the model, 9s. extra.	

P. S. Although my Harrows answer every purpose, as described before, and represented by my model ; yet I flatter myself I have discovered an improvement, which I beg leave to lay before the Society.

Experience

Experience teaches me, it would be very useful to heighten or lower the Harrows occasionally, particularly on broad lands rising in the middle, where of course the middle Harrow takes most hold, and generally requires the least: this is easily effected, by fixing an iron with notches (like those on the fore bar, by which the whipple-trees are supported) on the hind bar, instead of the hooks, and the hooks put on those irons.

The

The GOLD MEDAL was this Session voted to THOMAS SKIP DYOT BUCKNALL, Esq. for his extension of Observations on ORCHARDING, as communicated in the following Paper.

S I R,

IN this year's Paper I desire to introduce to the Society some valuable additions to the science of Orcharding :

First—The removing trees of the age of twenty years or upwards, to supply any deficiencies ; by which means the rows in the plantations will be fully kept up, and the Orchard remain perfect, with trees of the same age and sort as those which have decayed or died.

Secondly—The engrafting of new bark upon trees that have been injured by cattle, carts, &c. and thus trees kept in a perfect state, which otherways would have died, or soon gone to decay. But I wish previously to impress on the minds of the Society, that, in the whole extensive Orchards
throughout.

throughout the kingdom, most of the standard fruit-trees may be prevented becoming rotten, hollow, or much decayed, until, by great length of time, a dryness, want of energy, or by their own weight, they fall into actual dissolution; and as it is allowed that large trees yield the most productive crops, either individually, or per acre, attention should be given to run the trees to size; for at present there is no competent idea to what extent trees may be induced to grow, by a suitable manure and proper management.

The baneful effects of canker may be nearly banished from the more delicate fruit-trees, and the oozing of gum in great measure prevented in the different species of the cherry, and other stone fruits.

In the first Paper I did myself the honour of presenting to the Society, I represented that “ pruning is an important article, “ with regard to the health of trees, and “ their bearing; and, if judiciously done, “ they will come into bearing sooner, and “ continue in vigour for nearly double their
“ common

“ common age.”—See Vol. XI, page 12. That attentive care which chooses the proper soil; places the trees at due distances, according to their natural growth; keeps the branches free and open, that the sun may pass over the ground; all being perfectly pruned and regularly cleaned, so that the tree may become healthy, round and large, and carefully apply the manure and culture most proper for fertilizing the lands appropriated to Orcharding: when these advantages shall be really united, it may reasonably be expected that the fruits must be larger, finer coloured, freer from specks, and of a richer quality; whence such fruits must have a pre-eminence in the markets; or, if originally intended to be thrown into the mill, the cider will be more in quantity, stronger, and higher flavoured; proofs of which may easily be brought. As I apprehend the Orchards and standard fruit gardens of this country may soon be estimated at some hundred thousand acres, and should expect from the improvements attempted to be introduced, that in ten

P

years

years time each acre, on an average, will increase by the improved culture to more than one pound per acre in value per annum, I hope it will not be thought arrogant in me to say, that I look upon myself as being the actual means of benefiting my country to the amount of more than three hundred thousand pounds a year.

And if Orchardists will consider this position to be founded in truth, it will be an incitement to their exertions. The premiums offered by the Society to promote the proper planting and culture of Orchards, it is expected will spread emulation among the planters and, (aided by the extensive improvements of inland navigation, by which fruit and cider may be conveyed from one extremity of the kingdom to the other), the culture of Orchards may be regarded as a national concern.

When pruning shall be fully understood, and generally practised, the benefits resulting therefrom will appear to be much more the effect of judgment than the result of actual labour; for I have often mentioned,
among

among my friends, my expectation, when the trees are properly brought into order, the whole system will be little other than penknife-pruning, except what may arise from accident or neglect. So far from wishing to have large limbs wantonly taken from trees, the rule is, “keep the branches out of the reach of cattle, then let them follow their natural growth.” (Vol. XII, page 211): this would soon be verified, if a few proprietors and cottagers considered the nature of this business, and began pruning their own trees from the first planting, by way of example. When the cottager comes to prune his master’s trees, then will each concur in opinion, for it depends more upon the mind than upon the hand; and yet there is no mystery—the master speaking, the cottager comprehends his directions, and thus the work would go on properly. In Mr. Boulding’s Certificate (Vol. XI, page 22) “we were sometimes in doubt whether a particular branch should be taken off or not; the rule established was, consider, will that

P 2

“branch

“ branch be in the way three years hence ?
 “ if it will, the sooner it is off the better.”

I have taken much pains to correct prejudice and establish a rational culture, and have no doubt but it will become general ; yet, I must confess, I should like to see it fully established in my own time. The whole system is grounded on the regular operations of nature in the productions of vegetation: the advantages are fully explained in the respective Papers ; and, for the mere labourer, there is a short abstract and instructions in Vol. XIII, page 170. I have reconsidered every thought, and find them all concenter in the single word HEALTH.

My chief inducement in writing on the art of Pruning, was to rescue so valuable a branch of Agriculture from neglect, or from the more destructive manner in which the work has hitherto been performed. Observe in my new system, “ the trees continue of the same size
 “ both before and after pruning, and all the
 “ extreme shoots keep at the same distance,
 “ which

“ which is an improvement not before
“ brought into practice.” (Vol. XII, page
212).

I have undertaken to produce four apple-trees within the same inclosure, each of which shall cover ten poles of ground long before they fall into actual decay ; and for that purpose have measured four trees on the north side of Sittingbourne, in an orchard belonging to a gentleman at Maidstone ; and, with proper management, there is no doubt but they may be brought to that size. As they stand close to the road, where they will be under general observation, I should think, if a visible improvement becomes apparent in trees thus marked for public trial, it would counteract the negligent habit of still suffering large trees to continue so incumbered ; these trees are of great magnitude, and cannot be less than an hundred years old ; are in high health ; yet much overrun with stumps, dead wood, moss, &c. I remember the ground more than forty years, and think if my system had been introduced when that orchard

was first planted, there would have been, instead of four trees, at least ten times that number, and of equal value. I must say they are noble trees, and might become beautiful, if that epithet may with propriety be applied to an apple-tree. I have had a long correspondence with the gentleman, either to purchase the Orchard, or to have the liberty of pruning those trees *gratis*; and, under such permission, I have determined not a branch shall be touched, but with consent of the tenant: I must not say more upon this subject until I know the result; if I am disappointed, there are other trees in the neighbourhood of the same age, but they are neither so healthy, nor so well suited for my purpose.

Several times I have been asked how much an old tree ought to be pruned?—The proper answer would be, if it be very old, and much incumbered, do not let in the cold winds; but, with care, take off the stumps, with all the decayed, rotten, and blighted branches, leaving the rest to the discretion of each person, who will soon see
how

how much is necessary; self-conviction being the best school for improvement. The truth is, whoever would form Orchards to produce credit to himself and profit to his successor, must not suffer the trees to become old before the operations commence, but determine that pruning, cleaning, and rubbing off the rotten bark, should be begun in the nursery, and regularly continued to the extremity of old-age; from which method very little wood need be taken off at a time; and, by using medication, the wounds will heal, without causing any more blemishes than the tree was subject to at the time the limb was taken off; for it is not the first cutting which blemishes the tree, but the corrosion, arising from neglect.

Let each person therefore determine that no standard fruit-tree should be suffered to remain incumbered with rotten and decaying branches; for these, admitting the water into the tree, and contaminating the balsamic virtues of the sap, lay the foundation of sure destruction to the tree, and fur-

nish to insects a *nidus* under the rotten bark, in which they deposit their eggs.

I mentioned to Mr. Fauſſet, in the year 1789, as appears in Vol. XI. p. 12 and 15, that the greater part of the miſchief affecting my trees, aroſe from insects, vermin, and microſcopic animalculæ, getting under the bark, which has the laſt year been more fully elucidated by William Hampſon, of Dewnap, Eſq. in the Thirteenth Volume of Tranſactions, p. 172, under the article Inſects; and the prevention is there ſo properly pointed out by him, that, in the character of Orchardiſt General, I wiſh ſtrongly to enforce the practice. I have often ſeen whole crops of the more delicate apples deſtroyed by the foliage being eaten off in the ſpring: the hardy fruits are not ſo liable to theſe diſaſters, for the ſtrong health of thoſe trees in a great meaſure ſecures them from ſuch depredations.

Laſt ſummer, in Kent, I had much converſation with ſome very intelligent men, on the ſubject of Orcharding and general Agriculture. A gentleman on the hills ſhewed

shewed me some large trees, and asked my opinion.—I replied, Do nothing ; for you can gain no credit by them, from the energy or active powers of vegetation having been long exhausted in those trees : but I pointed out some young ones where pruning might be happily applied, and he might make a trial on one of the large ones.

At Brambling, I visited an Orchard at the request of the owner : the trees required more cleaning than pruning, and I requested he would be careful to attend the operation himself, and his orchard would become more valuable, by the quantity and quality of the fruit. I recommended him to enclose the ground, which contained about six trees, with hurdles, and he might easily unite that spot with his pig-styes, and suffer the hogs to be constantly running over that ground ; and, from the manure thus obtained, the trees would receive a visible energy, which would soon appear in the growth of those trees, when compared with the others, and that the improvement of the trees was to be the criterion for him

to

to act by; for the freer the trees grow, the more effectually they recover the pruning, by throwing out young wood: and I remarked, that if the Orchard was my own, I would open the gate, without reward, for the drovers to bring in the yearling cattle, which pass the road from October to Midsummer, for three years; and such practice would double the value of the fruit: I mean, to what it will be ten years hence, for the trees are visibly going off, though now they are just in a state to be recovered.

Last year I recommended cleaning by soap-suds (Vol. XIII. p. 168). A gentleman at Wandsworth uses oil, which has a wonderfully good effect. I should think the oil might be applied about a month after the suds. As I am, in large concerns, a friend to cheapness for the bulk of mankind, I imagine any damaged oil would do: oil certainly is beneficial to trees.

These observations are sufficient to shew that I am attentive, and vary the advice, according to the state and value of the trees.

Some

Some gentlemen in my neighbourhood have made very handsome exertions; but I wish to bring the improving trees into universal practice, and keeping them in bearing to a great age; and would recommend that persons, for their own satisfaction, should select a certain number of trees, according to their fancy, and mark them in pairs, as to their age, freeness of growth, and other circumstances, suitable to trial, prune and manure one, and leave the other in the state of nature; but, for experiment, do not prune two trees, standing next to each other, in the same year, when the pre-eminence of the practice will soon appear:—such a mode is bringing Orcharding to a fair trial; and, if I had been so prudent as to have managed my trees alternately, two-thirds of the growers in East Kent would have acquired the science before this time. It may appear that I argue this subject too strongly; but, when we recollect that the Society has been thirty years engaged, and shewn most assiduous and laudable exertions, aided by many high premiums, to ascertain
the

the comparative advantages of the Drill and Broad-cast Husbandry, we must cease to wonder that the science of Orcharding has not made greater progress.

It is recommended, that the rows of trees should not stand north and south, but a point of the compass towards the east, as the sun will then shine up the rows soon after ten o'clock, which, in the spring of the year, will serve to dissipate the vapours collected in the night: these vapours stunt the fruit in the early stages of its growth; and, where the shaws are properly attended to, this position will best enable them to divide and blunt the power of the winds, and prevent blights, and the shaw might be a little brought over the south: but, as each situation has a predominant wind, this is only hinted to put the planter upon his guard: the shaw also will greatly protect the fruit from the severity of the autumnal winds, at which season half the crop of fruit is thrown from the tree before it is ripe; and the heads at that time of the year being loaded with fruit and leaves, many
trees

trees are actually torn out of the ground, or so lacerated as to be spoiled, which a proper shaw might prevent. Judicious shelter should be the first object thought of in forming an Orchard on a large scale.

Had I been possessed of ground near my own dwelling, I should ten years ago have planted an extensive experimental Orchard—it would have given me much pleasure; but there is no land attainable; and experiments cannot well be conducted at a distance, to any great credit, where the only object is to raise emulation by way of example.

When I pruned the trees in my Orchards, at Sittingbourne, in the year 1790, they being young, I cut freely, for they were greatly incumbered and decaying, and half the wounds were made by taking off the stumps, and cutting down the cankers and gum, as certificates fully prove (Vol. XI. p. 26); and I was certain the trees would be greatly improved by the pruning: but I must mention they have not been touched since, lest any person who may examine
the

the Orchard by way of observation, might confound the former and new wounds together.

Let no one be afraid of the expence, for that is trivial; fourpence-halfpenny per tree once in three years would overpay it, after the trees have been brought into order, if the master would only take care they are kept clean, and the casual accidents duly attended to (see Vol. XIII, p. 167). According to my ideas, the age of a tree is not to be considered; for the judgment must be taken from the energy and freeness of growth, as many trees are in a more declining state at sixteen years than others at an hundred. Since I have mentioned comparative age, observe, from sixteen to twenty is a critical time for the delicate fruits: if they continue in health beyond that period, they generally go on well afterwards; and, upon some future occasion, I shall introduce Root-pruning.

Were it necessary more fully to enforce the practice of pruning, suppose an order was given, that all peach-trees should remain

main unpruned for five years : from thence be assured, there would scarcely be a high-flavoured peach in the kingdom, all either sour or insipid. The apple or cherry do not require the same care the peach does ; yet each are well worthy of attention. I observed, in Vol. XII. p. 217, “ that sun-
“ shine and shade are unalterably the cause
“ of sweet and sour fruits.”

Those acquainted with the wine-countries know that the natives bestow much labour in manure, culture, pruning, and more particularly in bringing the grapes to perfect ripeness ; and I do not see why, in Britain, some part of that attention should not be given to the apple.

It is proper here to recommend to nurserymen, to be attentive to their GRAFTS, for more depends upon it than is imagined ; as, from the grafts being full, well wooded, clear, and properly chosen, the fruit will be both larger and higher flavoured. Though the soil and culture may be the same, the health of the wood of the tree is also most materially affected during the whole time
of

of the tree's existence, by the proper maturity the scion was in at the time it was first put into the stock.

As this is to be my last essay, I wish to send it out as perfect as I can, and beg excuse for the great length. Let any person, whose mind has, by precept, been turned to philosophical enquiries, consider the following statement: when an Orchard has become old and much encumbered, so that the trees, from being too thick, totally overshade the ground, if one of those trees dies, the four next surrounding it will each of them throw out their branches to fill up that void space; the sap of those four trees tending that way by the active influence of the sun and air, and the other parts of those trees still remaining incumbered, will of consequence decline in vegetation; for the energy is drawn the contrary way. These things happen every day, but on the unobserving eye make little impression. This intuitive energy of nature is not confined to vegetation, for it pervades all nature: then why not suppose, if a part of a tree is decayed,

tayed, and you take it out, that Nature is capable of filling up the void space: that she is capable, is most undoubted, and she will do it too, if there is any energy left, by supplying younger and better-bearing wood than that which is taken away.

Where the trees are so close and incumbered, that the agricultural vegetation cannot thrive under them, the fruit from such an Orchard will hardly be large and high-flavoured; neither will it keep so well.

Last autumn, the delicate fruit-trees were much incommoded with a whitish mould or mildew, which I have regularly observed to take place in what is called muggy weather; this is what lays the first foundation of canker; it was very prevalent about seven years back. I have long known it to arise from animalculæ settling on the wounded parts of the tree, and the shoots of the present year. In Vol. XIII. p. 169, I pointed out the cure, which is rubbing off with the lard medication; and I recommend to have the shoots cut at a large bud; for, when they have been thus

Q affected,

affected, there are but few of them will stand the cold of the winter: they generally die off about half way up. I have formerly quite removed the canker from some nonpareils, which, after three years medication, threw out shoots a yard long: this induced me to say, that the mercury gave an energy to the plant; I mean, by the mercury curing the disease, the plant recovered its energy: any one may satisfy himself that it is animalculæ, by rubbing a little of the mildew between his thumb and fore finger, when the insects actually break, and produce a matter like the cochineal fly (*coccus mali*).

Another circumstance worthy observation is, the custom of attempting to check the too great flow of the sap, particularly in pear-trees, by cutting a circle through the bark, with the intention to make the tree fruitful; much better would it be, by natural means, to lead the sap regularly through all the branches; the action of the sun would then properly impel it to the extreme parts of the tree, for swelling the
buds

buds, and supporting the fruit; and this even flow of sap is what produces fruitfulness, and is implied, Vol. XI. p. 13—"The more the range of branches shoot circularly, the more equally will the sap be distributed, and the better will the tree bear."

Let me entreat those interested in fruit plantations, to unite in establishing and exalting the science of Orcharding, to make it one of the handmaids of Commerce: it is certainly the poor man's friend, the rich man's pleasure, the pride and ornament of the respective spots attached to each habitation. View the trees in spring unfolding and raising their beautiful blossoms and leaves up to the eye of Heaven, and in autumn gently bending their pliant branches for the industrious hand to gather the fruits. Do not wonder that I should shew a little enthusiasm for the welfare of a science which I have actually created, and from which I have received much satisfaction.

The Ancients had their goddesses Pomona, to whom they paid divine honours, which goddess was no other than an ideal superintendency supposed to preside over Orchards; which is a most convincing proof that they held the culture of fruits in high estimation.

Through the whole process I have confined my instructions to standard trees; but now say, they are equally applicable to fruits in general, even to the hawthorn, whose blossoms in spring, and fruit for the birds in autumn, make it worth some attention in parks, and such plantations.

For the full establishment of the art, nothing more is necessary, than to gain two or three capital land-owners in each district, who occupy their own estates, and influence them to examine the system, and follow it, from which much improvement must result. In every science the principles must be understood before the practice can become general. I am, SIR,

Your most humble servant,

T. SKIP DROT BUCKNALL.

*Hampton Court,
Jan. 6, 1796.*

MR. MORE.

The following Account of an Experiment made by Mr. Lake, and the Extract of a Letter from William Fairman, Esq. will throw great light on the Method of removing large Fruit-Trees, and engrafting new Bark on such Trees as may have been injured by the bark being stripped off by sheep, or any other accident; and it will be seen that, in the same Letter, Mr. Fairman gives a decided opinion on the appearance of the Fruit-Trees pruned under Mr. Bucknall's immediate inspection. Also, an Account from Sir John Morshead, Bart.

Removing large Fruit-Trees.

MR. LAKE, of Bapchild, in the year 1790, asked me if I could help him to remove about sixty cherry-trees? I did not think his reason to alter their situation sufficient to justify the expence, and attempted to dissuade him from it; but he persisting, I said, If you will order a semi-circular board, such as the bricklayers turn their

arches upon, of three feet six inches diameter, in which cut a center, and with a small spade dig a trench round the tree below the roots; afterwards cut the ends of the roots with a sharp knife, and fill up the trench again; the year after thin the head very much, that the wind may have no power over it; and the next year so dispose the young suckers as to lay the foundation for a handsome head in future; and with these precautions you may venture to carry the trees farther than you want: but do not lighten the head the first year, as you will want the power of the head to make the roots work and throw out young fibres, and, at the time the trees are taken up, the roots will have many fibres; and as from this practice neither roots or head will have any wounds to heal the year the tree is removed, its growth will be greatly accelerated when the tree comes into the new situation.

All this was regularly done, and the trees removed in September, 1794. For further information, I refer to Mr. Lake, who is
a good

a good orchardist, and will gladly answer any question ; but am fearful, from the severity of the frosts of that winter, he will not be able to send proper certificates of the success till next year ; for, when I was there in May, 1795, they were very backward. However, this removing of large trees must come into this report ; because I beg of every planter, who wishes to do something worthy of the premiums, that he will order a certain number of trees, more than his new plantation requires, and place them in a retired part, to keep up his plantation ; and then he will say, “ A friend in “ need is a friend indeed ;” for such trees cannot be bought. If they are to come far, all the precautions are lost, from the fibres of the roots getting dry. I have practised this before, and will answer for the success.

Engrafting Bark on injured Trees.

In July I spent two days with Mr. Fairman, at Lynsted, in conversation on the

science of Orcharding and general Agriculture; and he mentioned a misfortune which befell one of his Orchards in the preceding winter. Some fatting sheep, in the severity of the frost, tore off the bark from many trees, actually quite round. Mr. Fairman was so hurt by the accident, that he was determined to do something, if possible, to save the trees; and it came into his mind to try whether, if new bark was bound upon the wounds, it would adhere.

I am, SIR,

Your most humble servant,

T. SKIP DYOTT BUCKNALL.

*Hampton Court,
March, 1796.*

Mr. MORE.

S I R,

MR. BUCKNALL having an Orchard in my neighbourhood, I took an opportunity, a few days since, of examining the trees which were pruned under his

his immediate direction ; and, I must confess, I was highly pleased with the beautiful form and appearance of most of them, finding my ideas were so skilfully anticipated : I expected to have found he had been too free with his instruments, from knowing his motive for pruning is to produce the fruit larger, clearer, and higher flavoured.

As I am an extensive grower of fruit, having about sixty acres chiefly on my own estate, the business cannot be indifferent to me ; and I shall be happy in following any information tending to the improvement of so valuable a branch of the agriculture of our county.

My inducement for troubling you is, to introduce a method of recovering apple-trees, which may have been stripped of their bark by sheep, or any other accident ; and, for the information of the Society, I must desire you will acquaint them, that, in the severity of the spring of 1794, some fatted sheep were turned into a valuable Orchard of mine, of about twenty years growth, and they in a short time actually
stripped

stripped the bark from several of the trees, entirely round the bodies, leaving the wood bare for at least sixteen inches.

I was so much hurt by the accident, as to determine to do something for the preservation of the trees, and save them if possible. The first step which I took was to take off the arms from several of the trees which were most injured; and, from the largest of those arms, I flaved off slips of rind of about two or three inches in width, and placed four or five of them perpendicularly round the naked part of the body; but I should observe, that I first cut away all the rind that was bitten, and then raised the rind up, top and bottom, and put the ends of the slips under, that the sap might circulate; and afterwards bound them exceedingly tight with rope-yarn: I then applied a composition of loam and cow-dung, with a little drift-sand, over which I tied some old sack; which was the whole of the process.

Mr. Dyot Bucknall, perceiving this method very likely to succeed, requested I would

help to give a recital, the heads of which we wrote on the spot, and he assured me he had sent them to you: but, lest he may have made any mistake, he wished I would send the account myself.

The experiment being made in the spring of 1794, a minute inspection at this time must determine the fate of it; and permit me to assure you, it has succeeded far beyond my expectation: the slips adhere as close, and are as full of sap, as the rind on any other trees. They are now in their full blossom, strong, and vigorous, apparently as if they had received no injury. But I must observe, were I to make the experiment again, I could do it more dexterously; and I must mention an error I was guilty of in my haste, by placing some of the slips the wrong way upwards; consequently the sap could not circulate.

I am, SIR,

Your most humble servant,

WM. FAIRMAN.

*Miller's House, Lynsted, Kent,
May 16, 1794.*

Mr. MORE.

SIR,

S I R,

MR. DYOT BUCKNALL having mentioned in his report of this year, that some gentlemen of this neighbourhood had made great exertions in the science of Orcharding, and finding that the Society expect certificates of all matters that are to be introduced into their Transactions, I feel it necessary to inform you, that, in the autumn of 1794, I began to practice close pruning and medication, according to Mr. Bucknall's directions, on a great variety of fruit-trees, of all ages, and that I find it answer far beyond my expectation; particularly in two very material points, the destroying of canker, and stopping the oozing of gum; and I am so well convinced of the great advantages to be derived from Mr. Bucknall's system of close pruning and medication, that I shall continue to practice it on a large scale myself, and shall also recommend it strongly to my friends and tenants in

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the county of Cornwall. I have the honour to be,

SIR,

Your most humble servant,

JOHN MORSHEAD.

*Hampton,
January 17, 1796.*

Mr. MORE.

The

The Thanks of the Society were this Session given to RICHARD RAMSDEN BRAMLEY, Esq. for the following Paper on a Method of constructing BANKS to guard against the Inundation of the Sea.

THE procuring of new scenes, on which industry may act with profit, is so desirable an object, that I hope the Society's excuse for introducing an idea, which, should it answer, may be of considerable utility, and which is, the application of the system of puddling in embankments made near to the sea, and liable to be overflowed at spring-tides. In such situations, water is to be found almost with certainty at a few feet under the surface; and the great barrier to inclosure or embankment in such situations being the difficulty which occurs in giving sufficient density to the bank, and thereby enabling it to resist the spring-tides, the following mode would, it is supposed (where a small portion of ooze is intermixed with the sand), be capable of binding the same so firmly, as to give it a density sufficient

cient to resist the impulse of the tide. Having first laid out, ideally, the ground intended to be embanked, it will be necessary to fix pumps at one or both ends of, or more spaces in the line, capable of throwing up considerable quantities of water; and, in proportion to the work intended to be done, to have extra hands, rather than be in any respect deficient: the line should then be drawn with a convexity to the water, and the soil dug over and puddled as a base, continuing the same mode for every five or six inches thickness of soil thrown on above the surface, and guarded by an external wall of loose earth or silt: the pumps at each end should be set to work, making a channel for the water to run centrally along the bank, and, as fast as it could proceed, to have parties stationed ready to puddle it nearly from side to side; which being brought to a proper consistence, another layer should be thrown thereon, and in a curving shape, narrowing upwards from the base: the same process in puddling should be then renewed, and alternate applications

plications of fresh soil and puddling be proceeded on, until the bank is raised to the height sufficient to guard against the highest tides.

Earth in this puddled state becomes so dense as to resist the impression of water, which can by no means penetrate it; and, though the experiment has not to my knowledge been before thought of, or tried in such situation, yet I apprehend it will, by this means, acquire a compactness of substance, sufficient to withstand every common effort of the tides: after it is once completed, and by strewing a few hay-seeds on the curving sides, it would probably soon be covered with a complete greenward, which would be forwarded much by the moisture exhaling from the adjoining puddled earth; thus answering the double purpose, of making the internal earth cohesive, and promoting vegetation on the surface. The idea originated in reflecting on the solidity attained in the puddled banks of canals, &c. which mode might probably be thus applied to purposes of unbounded utility;

utility; and where under-drains are necessary to quit land-floods or streams, care might be taken, prior to forming the bank, to leave proper vacancies for their reception, after its completion. Should these hints be thought worthy of attention by the Society, I hope their public recommendation will induce a trial to prove the efficacy; and the hearing of attendant success will give a great pleasure to one who wishes to promote every object conducive to the progress of Agriculture.

I am, SIR,

Your most obedient servant,

RD. RAMSDEN BRAMLEY.

Leeds, Feb. 6, 1796.

MR. MORE.

A Bounty of FIFTY GUINEAS was this Session voted to Mr. RICHARD EAGER, of Graffham Farm, near Guildford, Surry, for communicating to the Society his simple yet effectual Method of relieving CATTLE and SHEEP, when, from eating too voraciously of Clover, or any other succulent food, they became swollen, or, in the language of the farmer, *boven*; and which, previous to this discovery, has been attempted to be cured by stabbing them into the paunch; a method of proceeding always dangerous, and very frequently fatal to the animal. A Cut of the Instrument invented by Mr. EAGER is annexed to the Description, and is so simple that it may be procured at a very reasonable price.

S I, R,

MR. EAGER tells me that he has sent up two of his instruments to you, with directions. In the enclosed Paper

Paper he explains the principle of the disease, and of the cure. I am convinced that he is right, and that the Hoven of Cattle is solely occasioned by the vent upwards, for the wind, being obstructed; which obstruction his instrument removes; and I believe it to be an easy and infallible cure.

I am

Your very humble servant,

EGREMONT.

Mr. MORE.

MY LORD,

AS you have been so kind as to offer to forward for me, to the Society for the Encouragement of Arts, Manufactures, and Commerce, my observations on Bulls and Sheep, and why, in my opinion, they are more liable to be blown or hoven with young clover, rape, or turneps, than with any other food, I have taken the liberty to enclose this to your Lordship, for that Society's consideration.

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As young clover, rape, and turneps, are of a succulent nature, Cattle are induced to eat more than they otherwise would do: the extra quantity of fixed air which that sort of food produces, more than common grafs, makes the Cattle more liable to be blown with that than any other food: the extra quantity of fixed air taken down by such food more than by other grafs, occasions the necessity of more wind being discharged from the paunch of the beast upwards: this forces the broad leaves before the passage at the entrance of the paunch, which stops the wind from going upwards in its regular course: the paunch immediately begins to swell; the heat of the body rarifies the air in so rapid a manner, that it stops the circulation of the blood, and the beast, whether Bullock or Sheep, is dead in half an hour.

I have sent two of my instruments, one for Bullocks, the other for Sheep, directed to Samuel More, Esq. Adelphi, London, for the inspection of the Society, with directions for using them; and, as hundreds
of

of Cattle may be saved every year by this simple instrument, and the Inventor's wish is the public good, whatever the Gentlemen of that Society shall think due to my merit for the invention, it will be received with pleasure, by

Your Lordship's much obliged
and most humble servant,

RICHARD EAGER.

*Graffham Farm,
near Guildford,
March 2, 1796.*

EARL of EGREMONT.

S I R,

I RECEIVED yours of the 12th instant, and have sent you proper directions for using my instruments; likewise the instrument for removing either turneps or potatoes, if a Bullock gets them in his throat, when fed with either of those roots, which instrument I have found to be very useful in such cases. I have saved two of my own

R 3 this

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this winter. I have begged the favour of Lord Egremont to write you his opinion of the utility of my instruments, as he has had an opportunity of trying them often with success.

I am, SIR,

Your very humble servant,

RICHARD EAGER.

*Graffham Farm,
near Guildford,
April 23, 1796.*

Mr. MORE.

THIS is to certify, that I, Charles Ellis, of Noar Farm, in the parish of Bramley, in the county of Surrey, had an ox violently strung or hoven, and must have died in a short time; knowing my neighbour Mr. Richard Eager had invented an instrument for relieving Hoven Cattle, I sent to him, who immediately applied his instrument, which effectually cured my bullock in two minutes: the ox returned to his food, and, in less than half an hour, eat

as

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as hearty as he did before. In justice to Mr. Eager, I have hereto set my hand, this 25th of April, 1796.

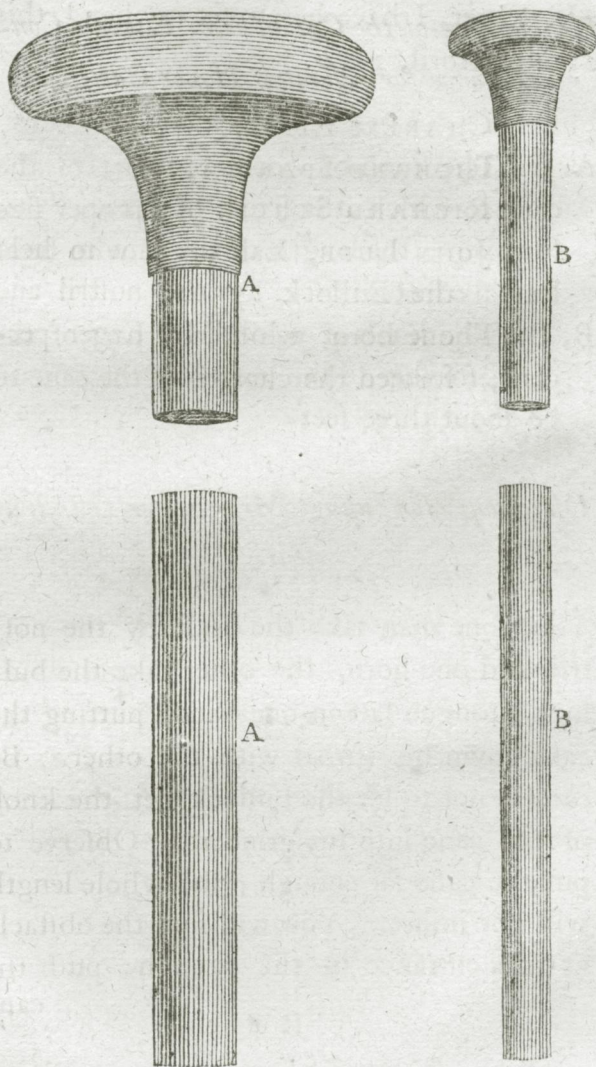
CHARLES ELLIS,

RICHARD SPARKES,

RICHARD STREET ELLIS,

JOHN LUFF, Labourer, who held the Bullock by the nostril and one horn, while Mr. Eager performed the cure.

*Mr. EAGER's Instrument for relieving
Hoven Cattle.*



Explanation of the Cut of Mr. Eager's Contrivance for relieving Hoven Cattle.

- A. A. The knob of wood, and part of the cane to which it is fixed, of a proper size for oxen : the length of the cane to be at least six feet.
- B. B. The knob of wood, and part of the cane, for sheep : the length of the cane to be about three feet.

Directions for using Mr. Eager's Instrument.

Let one man take the beast by the nostril and one horn, the other take the bullock's tongue fast in one hand, putting the cane down his throat with the other. Be careful not to let the bullock get the knob of the cane into his grinders. Observe to put the cane far enough ; the whole length will not injure. You will find the obstacle at the entrance of the paunch : push the
cane

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cane hard, and when you find the smell
from the paunch, and the bullock's body to
sink, the remedy is performed, and nature
will act for itself.

PAPER